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Original Communications.

THE TREATMENT OF PULMONARY TUBERCULOSIS BY CREOSOTE.

BY EDWIN E. GRAHAM, M.D.*

SINCE the publication by Sömmerbrodt of the use of large doses of creosote in the treatment of pulmonary tuberculosis, much has been written upon the employment of this remedy. Some observers would make us believe that we have finally in creosote a medicament which *per se* is almost a specific. Others are less hopeful, but employ it with a certain degree of confidence. Many, after a thorough trial, have entirely abandoned it.

The following observations are based upon a study of two hundred and twenty-eight cases. Of these, one hundred and ninety-two patients were treated by the author in the out-patient department (medical department) of the Jefferson College Hospital; the remaining thirty-six cases were private patients. The observations were continued over a period of eleven months, beginning in June, 1891, or about four months previous to the publication of Sömmerbrodt's

* Clinical Professor of Diseases of Children in the Jefferson Medical College, Philadelphia.

article. All uncertain cases—*i.e.*, cases in which the physical signs and symptoms did not indicate undoubted phthisis—have not been incorporated in this report. In many the diagnosis was rendered certain by the presence of tubercle bacilli in the sputum.

As the major number of the patients were seen in dispensary practice, creosote was employed only by the stomach, as it became evident early in the progress of this investigation that its administration, either hypodermically, by inhalation, or the rectum, presented difficulties which could not in out-patient department work be overcome. Special care was taken that only pure specimens of the drug were employed, and a careful record kept of all visits made by each patient. The conclusions arrived at are, of course, open to the same criticism as all such records are,—their incompleteness. Nevertheless, from a study of such a large number of cases, it is certainly possible to draw at least general conclusions.

Some may ask, Why is this record so incomplete? Why, if these patients are improving under treatment, do they not regularly return? The answer clearly is, The loss of time involved out of the working hours of the day, the drifting of these patients to *free* dispensaries. Many, finding that the treatment is not being constantly changed, simply have their prescriptions renewed. Others, after improving, stop all medication and return to work. The last cause applies especially to patients in the first stage of the disease, who, feeling the demands upon them to work, often cannot be made to appreciate the importance of regular medication. Those who present evidence of the second and third stage of the disease, being often unable to work, quickly drift to hospitals.

Occasionally patients are met with who cannot take creosote, owing to its odor, or their friends and co-laborers object so much to its odor that they desist from its employment. This can usually be obviated by giving the medicine in capsule. When possible, however, I much prefer giving it in milk, and if thoroughly shaken, by the placing of a covering-glass,—similar to the manner of making lemonade,—it is usually well borne.

The range in the dose of creosote is a very great one. Few patients will be found who cannot for a long period take 5 drops in milk after meals. Many will easily take 15 drops three times daily. 40 drop doses will not be followed by any disagreeable consequences in a few; and in one patient, whose history is given later, 72 drops were given three times a day. The plan which I have always followed, however, is to begin with a dose of 1 drop and gradually increase. Usually each day an additional drop has been added to each dose until 15 drops are taken daily, when the additional drop is added every second day. Occasionally it was given in capsules; those manufactured by Chapoteau answered the purpose admirably. The benefit derived from this plan of treatment is usually in direct ratio to the amount of creosote administered. The quantity given must, however, be regulated by the individual. Loss of appetite, nausea, or a distaste for the remedy should call for its immediate discontinuance, and subsequently the administration of a smaller dose. This has repeatedly enabled me to finally reach a dose of 15 or 20 drops, when previously half the quantity had been reluctantly taken.

All who have used creosote largely place great stress upon the dosage and method of administration. Many advocate its use by inhalation, stomach and rectal injection. My favorite solution for inhalation is the one so frequently used of creosote, gtt. x; spts. chloroformi, gtt. x; alcohol, gtt. xx. The inhalations may be repeated four or five times daily. Respiration should be quiet and deep. This combination is certainly of benefit in lessening the troublesome cough, especially during the night, hence indirectly promoting sleep and retarding waste.

As the author has never considered creosote a specific for pulmonary tuberculosis, but simply a valuable addition to the therapeutics of this disease, a tonic and symptomatic treatment has always been followed conjointly with its administration. Iron, arsenic, quinine, cod-liver oil, malt, alcohol, etc., have not been suspended, the best hygienic and dietetic conditions have been insisted upon, but the creosote, unless evidently disagreeing, was continuously administered, and only temporarily intermitted when evidently disagreeing. Why, unless we look upon creosote as a specific, should we rely solely upon it?

The following tables show the results obtained in the out-patient department of the Jefferson Hospital and private practice. Those patients who are considered in the first stage of the disease presented evidence of an isolated deposition of tubercle. Those in the second stage include all cases where the tubercular deposit was well marked. The third stage comprises those cases where soft-

ening, breaking down, and cavities were manifest. Temporary improvement in both tables applies to those individuals who were under observation for a period of three to six weeks. Continuous improvement, to cases treated for a longer period, many having taken the remedy for months. Apparently cured, to patients who *considered themselves* well, and in whom the symptoms of tuberculosis had disappeared, tubercle bacilli were no longer found in the sputum, and the physical signs showed a full expansion of the chest, a clear percussion-rate, no increase of vocal fremitus, and breath sounds, which, while perhaps slightly harsh, still largely preserved their vesicular character. No improvement, signifies a steady progress of the pulmonary affection. As none of the out-patient cases were admitted to the hospital, the percentage of deaths could, of course, not be calculated in the dispensary cases.

DISPENSARY CASES.

	Temporary improvement.	Continuous improvement.	No improvement.	Apparently cured.	Total.
First stage.....	75	30	2	12	119
Second stage.....	31	14	15	0	60
Third stage.....	6	0	9	0	15
Total.....	112	44	26	12	194

PRIVATE CASES.

	Temporary improvement.	Continuous improvement.	No permanent improvement.	Apparently cured.	Died.	Total.
First stage.....	1	4	2	11	1	19
Second stage..	2	5	3	0	0	10
Third stage...	0	0	3	0	4	7
Total.....	3	9	8	11	5	36

The table of private cases shows of necessity the value of creosote more markedly than does the dispensary report. This is due to the fact that they are, as a rule, a much better educated class, can better realize their condition, will more judiciously follow out the necessary regimen, and are surrounded by good hygienic conditions. Four patients only had the benefit of a change of climate. It was of decided benefit in three who were in the first stage; of temporary benefit to a case in the second stage.

Of the out-patient department cases, fifty-eight per cent. of all cases showed temporary improvement; twenty-three per cent. continuous improvement; thirteen per cent. no improvement. Of the so considered curable cases,—*i.e.*, those of the first stage,—ten per cent. were cured. This latter percentage is, however, certainly much below the true figure, as many of the cases would probably later fall under this head. Of the private cases, 8.3 per cent. showed temporary improvement, twenty-five per cent. continuous improvement, twenty-two per cent. no permanent improvement, and 57.8 per cent. of first-stage cases recovered.

In the study of the above cases the effect which creosote exerted upon certain signs and symptoms were carefully noted. To these I will briefly refer. The cough is very soon greatly diminished. This applies to all stages of the disease, but especially, of course, to those in whom the lung involvement is slight. Not infrequently in these latter cases it entirely disappears, with the exception of a slight attack in the morning after rising. Even in the second and third stages of the disease I have often been surprised at the diminution of cough caused by creosote. Even when the general condition of the patient gave no hope of an ultimate recovery, the cough was often much diminished, and the consequent suffering greatly lessened.

Hand in hand with the diminished cough will be found a falling off in quantity and an alteration in the character of the expectoration. In the first stage it may almost or entirely disappear, changing from thick mucopurulent and tenacious to thin, mucoid, and aerated. Even in the advanced stages of the disease, expectoration will often after continuous treatment be reduced from many ounces in the twenty-four hours to a few drachms, the change being often so marked as to attract the attention of the patient.

Auscultation reveals fewer râles, and dyspnœa is less easily induced by exertion. Respiration becomes slower and deeper. This is, in the opinion of the author, one of the main factors in the improvement noticed in these cases, as it insures less work to the lungs and heart, aids in the better oxygenation of the blood, and indirectly promotes the nutrition of the entire body, and especially aids the digestive organs. It allows of more exercise being taken, thus leading to an out-door life,

and creates a feeling of well-being and of confidence in the medication.

Creosote does not, in the experience of the author, affect to any extent, either *pro* or *con*, the appetite, nor has he noticed the marked reduction in pyrexia, following its use, which has been claimed by a few writers. Bitter tonics for the former and a modification of Niemeyer's pill for the latter, have, however, seemed to be much more efficacious in meeting the indications in those taking creosote than in those who were not employing it. High temperature and anorexia were often encountered, but their duration and results seemed by the above methods to be reduced to a minimum. As a result, improvement in strength and weight was a common occurrence in the early stages, and in the advanced forms of the disease a less rapid decline and a lessening of the exhausting afternoon fevers often noticed.

In the first stage of the disease night-sweats will often, after some weeks of treatment, especially if large doses are administered, largely disappear. Even in the later stages they are usually greatly diminished, and one of the most distressing symptoms, as a consequence, largely removed. In regard to the effect of creosote upon hæmoptysis, my experience does not convince me that it increases the tendency to hemorrhage. Many observers have, however, apparently noticed its tendency in this direction, and as the bronchial mucous membrane plays an important part in creosote's elimination and congestion of this mucous membrane follows its administration, it seems, at least upon theoretical grounds, to be contraindicated. In connection with the subject of hæmoptysis, an interesting fact has been noticed by the author. Loss of weight will be found not infrequently to follow hæmoptysis. This is often quickly regained. If creosote is given continuously,—*i.e.*, its administration not discontinued, either before, during, or after the hæmoptysis,—the loss in weight has in the few cases in which this point was studied been less in amount and more rapidly regained.

The effect which the administration of creosote exerted upon the tubercle bacilli was studied in a large group of cases. The results of these examinations, which were most carefully conducted by my friend, Dr. D. Braden Kyle, Assistant Demonstrator of Pathology in the Jefferson Medical College, are well illustrated by the following cases:

Case II.—G. R. T., second stage. Two stains made January 7, 1892, showed large tubercle bacilli, also a bacteria much larger, resembling Friedländer's pneumococcus. Appearance of sputum, thick and lumpy, with no tendency to form strata. Fenwick's test, negative.

Second Specimen.—Two stains made May 26, 1892, showed no change in the tubercle bacilli, but the large bacteria had disappeared. Appearance of sputum, more liquid, with a few cheesy masses, which settled to the bottom. Fenwick's test, negative.

Case III.—David C., first stage. Two stains made January 7, 1892, showed a few small tubercle bacilli, but from the limited number and irregular shape, the case was questionable. Appearance of sputum, thick and tenacious at the bottom, occupying about one-third of the fluid space; the remainder thin and watery. Fenwick's test, negative.

Second Specimen.—Two stains made May 21, 1892; no tubercle bacilli; expectoration has almost ceased.

Case IV.—Harry J., second stage. Two stains made January 7, 1892, showed many larger tubercle bacilli. Appearance of sputum, thick, tenacious, and foul-odored. Fenwick's test showed tissue-fibres.

Second Specimen.—Two slides made May 28, 1892, showed no alteration.

Case V.—Angus H., second stage. Two stains made January 11, 1892, showed a field filled with tubercle bacilli and numerous other micro-organisms, among which was one resembling the large bacteria found in Case II. Appearance of sputum, thick and lumpy, with no strata formation. Fenwick's test showed few (?) tissue-fibres.

Second Specimen.—Two stains made May 29, 1892, showed slight alteration in size and number of the bacilli, with the entire disappearance of the large bacteria. No other alteration.

Case VI.—Mary H., first stage. Two stains made January 14, 1892, showed typical tubercle bacilli. Appearance of sputum, liquid at top, with thick, evenly-mixed sediment at the bottom, which occupied at least half the liquid space. Fenwick's test, negative.

Second Specimen.—May 28, 1892, two stains; no tubercle bacilli.

Case VII.—Patrick R., first stage. Two stains made January 14, 1892, showed tubercle bacilli, with many spores. Appearance of sputum, thin and watery. Fenwick's test, negative.

Second Specimen.—May 27, 1892, no alteration.

CASE VIII.—Kate V., second stage. Two stains made January 14, 1892, showed small tubercle bacilli. Sputum, thin and tenacious. Fenwick's test, negative.

Second Specimen.—Two stains made May 11, 1892, showed few bacilli, but many spores; no other change.

CASE XI.—John A., first stage. Two stains made January 15, 1892, showed characteristic tubercle bacilli. Sputum, thick and tenacious; no strata. Fenwick's test, negative.

Second Specimen.—Two stains made May 11, 1892, showed much alteration of the bacilli, they now being small and irregular in size and few in number. The second specimen showed many other micro-organisms; no other alteration.

CASE XIV.—James H., first stage. Two stains made January 18, 1892, showed few bacilli. Sputum, thick and tenacious. By caustic soda test, no tissue-fibres.

May 22, 1892.—Patient states all expectoration ceased.

The administration of creosote was not followed by any untoward symptoms referable to the kidneys. It has not apparently caused or increased any existing albuminuria. An increase in the quantity of urine voided has been noticed in a fair proportion of cases, in which this point was noticed, but nothing more. In this connection the following report of my friend, Dr. Lawrence Wolff, Demonstrator of Chemistry in the Jefferson Medical College, is of interest:

"June 26, 1892.

"MY DEAR DR. GRAHAM:

"After giving you in a former report the results of a superficial examination of the urine of the patient James D., I submit below the results of three subsequent investigations of the same urine, with dates when submitted, also with notes as to taking or not taking creosote, as furnished by you. The last three examinations were especially made with a view to determine the influence, if any, of creosote on the tissue-waste, as would appear from the nitrogen-waste in the twenty-four hours. Your statement as to the quantity of the urine voided in twenty-four hours, amounting to 4½ pints, about equal to 2500 cubic centimetres, was taken as a basis for computation. Of course, it is assumed that the patient consumed much about the same food, especially albuminoids, during the experimental period. The amount of urea in the last two specimens may have been even more, on account of the ammoniacal decomposition the specimens had already commenced to undergo.

"*First Specimen.*—Examined May 27, 1892, patient taking 18 drops creosote t. d.; appearance, turbid; color, light yellow; odor, somewhat of creosote; reaction, alkaline; sp. gr., 1015; total solids, three per cent.; urea, 1.7 per cent. = 42.5 grammes in the 2500 cubic centimetres of twenty-four hours; chlorides, .54 per cent.; sulphates (SO_3), .17 per cent. =4.25 grammes in the 2500 cubic centimetres of twenty-four hours; no albumin, sugar, or biliary coloring-matter.

"*Second Specimen.*—Examined June 8, 1892, patient taking no creosote for twelve days; appearance, cloudy; color, yellow; odor, ammoniacal; reaction, alkaline; sp. gr., 1020; total solids, four per cent.; urea, 1.8 per cent. = 45 grammes in the 2500 cubic centimetres of twenty-four hours; chlorides, .75 per cent.; sulphates (SO_3), .164 per cent. = 4.1 grammes in 2400 cubic centimetres of twenty-four hours; no albumin, sugar, or bile.

"*Third Specimen.*—Examined June 14, 1892, patient taking 18 drops creosote t. d. for about one week; appearance, cloudy; color, light yellow; odor, ammoniacal and of creosote; reaction, alkaline; sp. gr., 1019; total solids, 3.8 per cent.; urea, two per cent. = 50 grammes in the 2500 cubic centimetres of twenty-four hours; chlorides, .75 per cent.; sulphates (SO_3), .11 per cent. = 2.75 grammes in the 2500 cubic centimetres of twenty-four hours; no albumin, sugar, or bile.

"The result of the above examinations may be summed up as follows:

"1. The amount of urea excreted shows a wasting process, the quantity being about fifty per cent. above the normal.

"2. The nitrogen waste seems about the same, whether taking creosote or not.

"3. The small amount of chlorides in proportion to the urea, prominently brings out the fact that the latter is pathologically increased, though the former may be retained also by inflammatory processes.

"4. The sulphates are not diminished, but rather increased, during the use of creosote in large quantities, unlike the action of phenol under such conditions.

"5. The increased amount of SO_3 is probably due to the greater amount of sulphur oxidized during the increased tissue-waste.

"6. While creosote given in large doses does not give rise to any pathological products in the urine, the study of the three specimens, as given above, does not show that

creosote affects in any way or inhibits the tissue-waste, as manifested by the eliminated nitrogen products of the urine.

"Trusting that this may prove of service to you, I am sincerely, your friend,

"L. WOLFF."

The almost unanimous verdict upon the uselessness of creosote *per se* in those cases where pyrexia is marked is fully in accord with the experience of the writer, and I now rarely prescribe it in such cases. Those patients who have the chronic form of phthisis and little fever present the best opportunities for successful treatment.

The exact *modus operandi* of creosote has not as yet been satisfactorily explained. The reduction of cough and expectoration, and the consequent lessening in rapidity of the respirations and improved sleep, must certainly be of benefit to the phthisical patient. That it at least inhibits the growth of the tubercle bacillus has been claimed by many, and the result of the sputa examinations, given on a previous page, indicate that it has some germicidal powers.

According to the researches of Jaccoud, quoted by Beverly Robinson (*American Journal of the Medical Sciences*, January, 1889), it would seem that creosote possesses the property of increasing the growth of the fibrous tissue in those portions of the lungs which are the seat of tubercular disease, and hence limits the spreading of the tubercular process. Jaccoud states that, after the bronchitis had disappeared and stethoscopic signs of a pulmonary lesion were reduced to a minimum, two or three months later there was an evident and secondary diminution in the extent of the affected area, and bronchial breathing and bronchophony on the periphery of this area. These signs would indicate that a fibroid condition with subsequent contraction had taken place around the portions of pulmonary softening.

Increase in weight not uncommonly follows the administration of creosote. This gain may be slight,—from two to five pounds. Occasionally, in the early stage of phthisis, a much more decided gain will be obtained. What has been often noticed by the author is the positive power which creosote possesses of checking the steady decline in weight which is such a positive index and unfailing attendant of the advancing strides of phthisis. This property of creosote has often been observed by the writer in patients whose hygienic surroundings were notoriously bad, as mill-girls, dress-makers, etc., and is well illustrated by the following case:

February 22, 1891.—Lizzie W., aged 20 years; mill-hand; cough, four months; abundant muco-purulent expectoration, occasionally blood-streaked; lost twelve pounds in weight; occasional night-sweats; general feeling of malaise; temperature, 99.3° F.; weight, 103 pounds; sister died of phthisis; examination shows slight involvement of both apices; creosote, gtt. i t. d. and increase.

March 11, 1891.—Creosote, gtt. x t. d.; no hæmoptysis since; cough and expectoration less; weight, 102 pounds.

June 14, 1891.—Creosote, gtt. xv t. d.; coughs considerably; profuse expectoration, occasionally blood-streaked; temperature, 99.2° F.

October 17, 1891.—Slight cough; scanty expectoration; weight, 103 pounds.

December 12, 1891.—Attack of influenza; temperature, 102° F.; cough worse the past six days.

December 27, 1891.—Creosote, gtt. xv t. d.; weight, 98½ pounds; loss probably due to recent attack of influenza.

January 9, 1892.—Creosote, gtt. xv t. d.; weight, 104 pounds.

February 21, 1892.—Creosote, gtt. xv t. d.; weight, 103 pounds; temperature, 98.6° F.; pulse 78; expectoration slight; very little cough; dyspeptic symptoms; stopped creosote.

March 10, 1892.—Weight, 102 pounds; cough worse; patient requested a return to creosote; ordered creosote, gtt. v t. d.

April 16, 1892.—Weight, 107 pounds; creosote, gtt. xv t. d.

May 14, 1892.—Weight, 106 pounds; creosote, gtt. xv t. d.

What I wish to call especial attention to in the above case is that the tubercular process was apparently held in check for a period of almost fifteen months, during which the patient worked as a weaver in a mill from 7 A.M. to 6 P.M., with an intermission of forty-five minutes for lunch. Loss in weight during four months preceding treatment, 12 pounds. Iron, arsenic, quinine, malt, etc., were, as in all my cases, given when indicated.

Notwithstanding the many published reports upon the use of creosote, little has been said upon the question of relapse after the taking of the remedy for long periods. The writer has noticed this in a number of cases, of which the following were striking examples:

W. H., aged 28 years; barber; cough for eighteen months; one year ago hæmoptysis, about a teacupful; since lost twenty pounds in weight; strength diminished; constant cough; moderate amount of expectoration; occasional night-sweats; evidence of consolidation at both apices; most marked at left.

July 2, 1891.—Weight, 128 pounds; creosote, gtt. iii t. d. and increase.

August 6, 1891.—Weight, 139 pounds; creosote, gtt. xxix t. d.

September 23, 1891.—Weight, 149 pounds; creosote, gtt. xlvii t. d.

October 18, 1891.—Weight, 149 pounds; creosote, gtt. l t. d.

November 13, 1891.—Weight, 127 pounds; creosote, gtt. xxxii t. d.

November 24, 1891.—Weight, 115 pounds; creosote discontinued.

The following case shows a relapse, after improvement, during a period of five months:

K. V., aged 30; housewife; same as Case VIII. Since two and a half years, cough, muco-purulent expectoration; since nine months, occasionally blood-streaked; irregular chilliness; flushes of heat; occasional night-sweats; appetite impaired; sleep disturbed by cough; slight loss in weight, about six pounds; examination showed deposit at both apices; tubercle bacilli in sputum. This seemed a case well suited for the creosote treatment.

September 15, 1891.—Creosote, gtt. iii t. d.; weight, 101 pounds.

October 1, 1891.—Creosote, gtt. x t. d.; weight, 104½ pounds.

October 23, 1891.—Creosote, gtt. xx t. d.; weight, 105½ pounds.

November 18, 1891.—Creosote, gtt. xxv t. d; weight, 110½ pounds.

December 7, 1891.—Creosote, gtt. xl t. d.; weight, 110½ pounds.

January 13, 1892.—Creosote, gtt. lv t. d.; weight, 108½ pounds.

January 27, 1892.—Creosote, gtt. lxv t. d.; weight, 107 pounds.

February 10, 1892.—Creosote, gtt. lxvii t. d.; weight, 103 pounds.

February 20, 1892.—Creosote, gtt. lxxii t. d.; weight, 106 pounds.

March 7, 1892.—Creosote, gtt. xxx t. d.; weight, 99 pounds; doing badly.

In the above case creosote was followed by the happiest results for a period of five months, weight increased, cough and expectoration lessened, physical signs of tubercular disease in lungs remaining *in statu quo*, when, without any assignable cause, the disease process began to advance rapidly, and patient ceased attendance at out-patient department.

From the twenty-three patients in the above tables reported as cured, many examples of the marked benefit following the use of creosote might be noted. So many carefully reported cases have, however, been recorded by other writers that this may well be omitted. The position which creosote occupies to-day in the Eastern United States in the treatment of pulmonary tuberculosis certainly does not support the results claimed for it by Sömmerbrodt. It is unquestionably a valuable drug in tubercular phthisis; nothing more. Success is more often reported and talked of than failure, and while the creosote treatment will probably, and deservedly, always have warm advocates, it must be looked upon as simply one of many—perhaps the best of all—means of combating this dreaded disease. If not combined with hygienic, dietetic, and symptomatic treatment, it will usually be found useless. If used in conjunction with the above, it will in a moderate per cent. of first-stage cases be followed by a cure.

It is undoubtedly true that the results obtained in the out-patient department do not represent the full benefit to be derived from its use, as its conjoint administration internally and by inhalation is followed by better results than if either method alone is employed. It has, however, simply been the writer's wish to report his experience with the use of a remedy which has won for itself a permanent place in the treatment of consumption.

PNEUMONIA TREATED BY ICE-COLD APPLICATIONS.

By W. Fred. Jackson, Brockville, Ontario.

THE poet who sings of the beauties of spring seeks his inspiration while the earth is still in the lap of winter. So, the practitioner of the healing art, in order to be prepared for the prevailing ailments of the colder seasons, must do a little thinking about it during the warmer months, and perhaps draw somewhat upon the last winter's experience of himself and others.

The fact that so many and various treatments are advised for pneumonia shows either that a really feasible and successful treatment is not generally recognized, or that, as Dr. Osler tells us, the disease is practically

uninfluenced for good by any treatment whatever, beyond general principles.

Upon the clear recognition of the morbid processes at work in the system, causing pneumonia and its series of phenomena, must rest the formulation of a rational and successful line of treatment for this disease.

The war which has raged about the treatment of this prevalent and often very fatal complaint has seen the banners of venesection, antimony, squills, opium, ammonia, alcohol, heat and cold, expectancy and heroism, with many others of lesser following, scour the field in serried array, with many ups and downs, in the fight for favor at the hands of the profession. And, latterly, the coal-tar derivatives, with their specious promises of cooling the fevered brow, have won for the time a position, in which strategy has had more effect than solid fighting capacity.

That pneumonia *is a specific fever*, in which the lesion of the pulmonary tissue is but an incident, is not, I believe, sufficiently recognized. Upon this one fact rests, I am firmly convinced, the rational and successful treatment of this, which is pre-eminently *the* disease of our colder months.

In all cases the general febrile condition is initiated and in full progress in advance of the lung lesion. The prompt recognition of the morbid process at work renders possible the aborting of the pulmonary sequence. I have seen and recognized the pneumonic fever in progress a full week before the characteristic signs appeared in the lung, and I have no doubt most readers have had a similar experience. The pulmonic fever itself would rarely promote a fatal result; and I feel safe in saying that, just so far as the invasion of the lung-substance (and the consequent interference with the action of a vital organ) is prevented, by so much will a fatal event in this disease be averted.

Another fact is to be borne in mind in the treatment of this and other febrile diseases,—viz., that in fever there is lessened elimination of heat, as well as increased production of it. And also that, in increased temperature of the human body, the morbific germs become more active in their growth and multiplication the higher the point indicated by the mercury. I think the inference is obvious.

Influenced by the foregoing considerations, I decided last winter to adopt the use of cold applications in the treatment of pneumonia. This decision was strengthened by confirmatory evidence, which I observed in the current medical literature.

During the past winter I treated about twenty-five cases of pneumonia upon practically this one line of procedure. The results were excellent in every way. The recoveries were prompt and rapid in all the cases but two. Of these, one was very prolonged, being secondary to la grippe and complicated with fibrinous pleurisy, and the other died. The latter was a hospital case,—a poor, miserable woman, who had led a wretched life. There was albuminuria, due—as post-mortem examination revealed—to cystic degeneration of the kidneys, and also concurrent peritonitis. So I do not think that any treatment whatever would have altered the result. I do not propose to go into statistics, for my cases are too few. But the beneficial effects of the treatment were so prompt and so apparent, *in the face of the greatest prejudice and opposition*, that they carried conviction to the most unbelieving. I have seen the application of ice-cold compresses terminate a case of double pneumonia of the base by crisis in sixty hours. This case was characterized by severe dyspnœa, pain, and a temperature of over 105° F., with total absence of breath-sounds at the bases when first seen.

Another patient, a woman of 74 years, with consolidation of right base, recovered in four days.

A baby, 2 years of age, with catarrhal pneumonia, most marked on the left side, was quite convalescent on the third day.

A laborer, 34 years of age, with consolidation of right base, delirious, and much oppressed for breath, required but two days' attendance.

A bride, 22 years of age, who had been undergoing the usual round of festivities, awoke, after a particularly fatiguing party, in a feverish and lethargic state. Called immediately, I stated the probability of pneumonia ensuing. After twenty-four hours there was the characteristic fine crepitation and stitchy feeling to the breathing; temperature, 105⅕° F.; pulse, 130. Ice-cold compresses aborted the lung lesion entirely, and produced a critical perspiration in thirty hours, at which time the norm was reached and persisted.

There is no need to enlarge these details. The cases are all down in my case-book, and they all bear the record that from the time the cold was applied, rapid improvement ensued.

The method was as follows: A large towel was wrung out of ice-water, and the thorax enveloped in it. A comparatively dry towel was laid over it, and a binder of flannel or

cotton held all snug. The ice-water towel was changed as often as necessary, in order to ease the pain and reduce the temperature. When the pain or dyspnœa was severe, or the temperature high, the intervals would be short, say five or ten minutes. As the symptoms improved, the changes were made only as the towels assumed the heat of the body. The face and limbs were frequently sponged with the ice-water, and when required a cold compress was put upon the brow.

The medication was confined to promoting a critical perspiration. This was effected by large doses of liquor ammonii acetatis and spiritus etheris nitrosi, well diluted, every hour. In one or two cases this had to be supplemented with pilocarpine muriate. No alcohol was required, except in the fatal case referred to. Antipyretics of the coal-tar series were not used, except in the one case just mentioned. The diet was principally of milk, and liberal in quantity. Incidental symptoms were met as they arose. In none of the cases was there any expectoration to mention. In some none at all, in others but a little. Free perspiration was usually succeeded by copious diuresis. As a precautionary measure, a wet compress was worn for twenty-four hours after the crisis, and changed when it became dry.

In order to obtain the effects to be desired in this treatment, the cold must be freely applied and with a firm hand, until the effect of a reduction of temperature and arrest of symptoms occurs.

The treatment is grateful to the patient. It can be managed without incommoding the sufferer, by the exercise of a little ingenuity. It is prompt in its effects for good, and it is easily applied.

In exceedingly plethoric cases I could conceive of the value of venesection at the outset, and, in fact, have so used it with excellent effect, but not in the series under consideration.

As the experience of twenty years' continued observation, I would most earnestly deprecate the use of opium, antimony, or blisters in the treatment of pneumonia; and my experience of the more modern antipyretics is hardly more favorable.

Under the usual routine treatment of poultices, expectorants, and whiskey, I can quite understand Dr. Osler's view as to the non-efficiency of treatment. But with the experience of the free use of cold, in the manner herein outlined, and in view of the etiological considerations advanced, I feel that a new and happier era is dawning in the treatment of pneumonia.

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THE COMMONER FRACTURES OF CHILDREN, AND THEIR TREATMENT.

BY EDWARD MARTIN, A.M., M.D.,* AND ELLWOOD KIRBY, M.D.†

WHILE the fractures of children are, in general, subject to the same laws which govern those of adults, there are certain peculiarities in regard to their distribution and treatment which warrant their consideration apart from the general subject of fractures.

The usual cause of fracture in children is, as in the adult, a fall, though at times it is due to direct crushing force, such as that applied by the wheels of a wagon. Of a large number of cases which we have treated, in no instance could muscular force be considered as either directly or indirectly the cause of injury. This might naturally be expected, considering the comparative weakness of the muscles in early life, though Broadhurst asserts that intrauterine fractures are nearly always dependent upon muscular contraction.

It is undoubtedly true that the bones of children are less brittle than is the case at a more advanced age, and therefore less liable to break from sudden strain put upon them. Still, the constant and thoughtless activity of infancy and childhood gives occasion for numerous falls and injuries, which would account for the frequency of fracture at this period of life. It is generally asserted that, on account of this additional source of traumatism, the comparative immunity from fracture which it would be natural to expect children to enjoy, is practically counterbalanced. It readily can be demonstrated, however, that children are in reality far less subject to fracture than are adults. Taking the decade between twenty and thirty, and comparing it with that up to ten years, it will be found that fractures are three times more common in adults of the third decade than in children under ten. Considering how greatly the numbers of the first decade preponderate

* Surgeon to the Howard Hospital; Surgeon to the Out-Patient Department of the Children's Hospital; Clinical Professor of Genito-Urinary Surgery, and Instructor in Operative Surgery, University of Pennsylvania.

† Assistant Instructor in Clinical Surgery, University of Pennsylvania.

over those of the third, it will readily be seen that this ratio becomes still more striking, and that fractures are decidedly less frequent among children than among adults. This is, of course, due mainly to the softness and elasticity of their bones.

Some bones are so largely composed of cartilage in early life that they are scarcely ever subject to fracture. Thus, in our tables (thirteen hundred and seventy-two cases), we have no example of fracture of the patella, and but few cases of fracture of the ribs. In addition to the elasticity of the bones of children, the periosteum is comparatively thicker and tougher than in the adult, so that, even though the bone is fractured, there is often no displacement, the periosteum not being ruptured. In addition to this peculiarity of the bony envelope, we believe that the feeble muscular development of the child is an important factor in favoring the very slight displacement which is usually found. Also, it must be remembered, that the fracturing force of a fall is usually slight, hence an important element in causing wide separation of the fragments is absent.

As a result of the deficient earthy matter in the bones of children and infants, a partial fracture, or the so-called "green stick" fracture, is not uncommon. We believe that in this injury a portion of the bone is always broken, except possibly in rickety children at the height of their disease. It is scarcely conceivable that an elastic staff, or rod of any kind, can be suddenly and violently bent, so that this bend will be retained, unless there is an absolute rupture of a certain number of fibres. We have treated many of these fractures, nearly always involving the bones of the forearm, or the clavicle, by immediate forcible correction of the deformity, and have always felt a tearing and breaking of the bone, often extensive enough to produce a complete fracture. Hamilton asserts positively that such an injury as simple bending of the bone without fracture cannot take place.

Although there are many recorded instances of true epiphyseal fracture, and many museum specimens prove that such fractures do occur, we believe that they must be exceedingly rare. We have never but once been able to diagnose clearly a fracture of this kind, and have but four recorded instances in our tables. Coulon and Guersant state that they have never seen such a fracture. Gueretin asserts that such a fracture does not occur unless there be comminution, a shell of the shaft of the bone always coming away with the epiphysis. In this opinion, Focher, Cruveilhier, and Bronai coincide. Hence it would seem that true epiphyseal separation is nearly always the result of preceding pathological change. In further corroboration of this, Foucher has shown that at birth a force of one hundred and twenty-six to one hundred and thirty-two pounds is required to produce epiphyseal separation, while after the fourth year a force of from two hundred and twenty to seven hundred and seventy pounds is necessary. Strelin, however, has collected thirty-seven cases of epiphyseal separation, twelve of the upper epiphysis of the humerus, twelve of the lower, three of the upper extremity of the radius and seven of the lower, three of the tibia, and one of the ulna. This author also dwells upon the rarity of these fractures, and upon the subsequent impairment in bone growth. Parrot calls attention to the epiphyseal changes incident to hereditary syphilis as a predisposing cause for such displacements. Fractures of children are, however, especially prone to occur near the epiphyseal junction. Thus, in nearly all of our cases of fractured humerus, the break was placed about the condyles, either condyloid, supracondyloid, or epicondyloid.

Since epiphyseal fractures may be followed by a partial or complete cessation in the growth of the shaft of the bone, the recognition of this form of injury is important. It should be decided rather upon anatomical grounds than upon any peculiarity in the symptomatology of the fracture. In the single case which came under our personal observation there was a transverse and splitting fracture of the lower epiphysis of the humerus. This was placed directly at the seat of junction of the epiphysis and shaft of the bone, giving an impression to the examining fingers as though the articular cartilage had been shelled off. There was soft crepitus, and a tendency towards forward displacement. The patient, a boy of 7, was healthy.

It is well known that comparatively the epiphyseal line is farthest from the joint surface at birth, and that this distance decreases with the growth of the bone. Hence such fractures are prone to occur at an early age. The tendency to suppurate which they occasionally exhibit is due to the cause which predisposes to such an injury, and not inherent to this variety of fracture.

The diagnosis of fracture in children is not always easy. Their bones are surrounded by a comparatively thick layer of soft tissues,

and the displacement is mostly trifling, or does not exist at all. Again, the fracture may be partial, when deformity will be the only sign that can be elicited. Absolutely no dependence can be placed on symptoms such as ordinarily exist in the adult. There is often an astonishingly slight amount of disability, and pain and tenderness may be practically absent, though, as a general thing, these two symptoms will materially guide the surgeon to the seat of trouble. A thorough search, without regard to the lamentations of the child, should be made, even when the slightest symptoms suggest such an injury.

It is so common to have children brought to the out-patient department with fractures one, two, or three weeks old, not recognized until the lump of callus makes its appearance, that it seems not amiss to urge most careful examination in even trifling injuries to children, and a reliance upon anatomical knowledge, as applied to the child's body, rather than to the statements of a nurse or mother.

Crepitus cannot always be elicited, and is rarely as grating as is the case with the adult. Swelling comes on rapidly, and in the neighborhood of a joint quickly masks all bony landmarks. Ecchymosis, appearing two or three days after the injury, is peculiarly liable to occur in children. This is so constant with them that it has been of distinct service to us in diagnosticating certain obscure cases. There is one bone in particular, which, if fractured, nearly always causes, sooner or later, a skin discoloration. This is the clavicle, and since it is generally broken by indirect violence, particularly by falls upon the shoulder, we believe that the appearance of this ecchymosed spot is almost pathognomonic of this fracture. Where the violence has been direct this sign has, of course, no value.

Bullæ filled with clear or blood-stained serum are also prone to form about the seat of fracture in children. It is asserted that they are pathognomonic of grave bone lesions. We have never observed them without great swelling and deep extravasation, and have ascribed them to interference with the nutrition of the skin or its nerves, incident to this tension.

The prognosis of fractures in children is always good. Even without treatment, without splinting or restraint of any kind, the result, in so far as function is concerned, is often excellent. Of the untreated fractured clavicles, we have seen a few exhibit an amount of callus not greater than would be considered satisfactory after careful bandaging. Wallace taught that the best results were to be obtained by treating fractures of the thigh and leg without any retention apparatus. The children were put to bed, and were allowed to keep the limb in any comfortable position. He reported invariably good results without deformity. In one untreated case of fractured femur seen by us, the outward bowing was very great, and there was a mass of callus, which threatened permanent crippling by the pressure it exerted on surrounding structures.

It is generally believed that union takes place more promptly in the broken bones of children than in those of the adult. Berry reports complete consolidation in nine to eleven days. One fracture of the shaft of the humerus was firm in fourteen days. With this belief as to early union we are not in full accord. It has seemed to us after many examinations that union was but little more rapid in children than in the adult. We have repeatedly felt slight motion from yielding of the soft callus at the end of the third week, and have never failed to find this after the fourteenth day.

Recovery does undoubtedly occur sooner in the young than in the matured, but the difference in time is one of days and not of weeks.

Not only is the prognosis of fracture from a functional stand-point good, but there is ultimately scarcely any deformity in the vast majority of the cases. This is, of course, due in a measure to the slight displacement at the time of fracture, and the lack of muscular resistance which so often renders treatment difficult in later life.

Ununited fracture in children is exceedingly rare. We have never encountered such a case, and reports of them are difficult to find. Guersant saw but one; Sollier saw but three. This is a noteworthy fact, since many fractures are not recognized and receive absolutely no treatment, while in others the treatment is rendered abortive by interference with dressings on the part of well-meaning but ignorant parents. In one case under our charge, a child with a splitting fracture of the condyles of the humerus, used the internal angular splint in which his arm was dressed with telling effect in delivering underhand stomach blows during disputes with his comrades. He broke two splints in twelve days; then went without treatment. There was great resultant deformity, the internal condyle being almost completely reversed. There

was ultimately, however, firm union and about half the normal elbow motion.

About the elbow-joint the prognosis must be guarded, on account, it is taught, of a resultant plastic synovitis, which may cause anchylosis. We do not believe that anchylosis is ever occasioned in this way after fractures. It seems scarcely plausible that an aseptic traumatic effusion into the joint of a healthy child should occasion permanent crippling. Rather it and the adhesions incident to inflammation would be quickly absorbed. In all the cases of anchylosis we have seen, the stiffness was due to bone deformity. This arose either from failure to reduce the fracture, or to excessive bone-formation about the joint after perfect reduction, incident to the traumatism acting as an osteogenetic excitant. Even a dislocation occasionally will be followed by a growth of osteophytes, which will seriously interfere with motion, and may lead a surgeon not familiar with this form of growth to conclude that the original lesion must have been a fracture.

Of course it is possible to produce joint stiffness by continued splinting and neglect of passive motion. We recently saw one such case of long-standing, which was accompanied by so much atrophy that it suggested the possibility of the musculo-spiral nerve being pressed upon by the large amount of callus found about the external condyle. Exposure of the nerve showed that it was healthy, and electricity and massage are now restoring the wasted muscles and disused joints.

We have several times seen delayed union in children, in one case even up to the sixth week, a fracture of the shaft of the radius still exhibiting motion. This delayed union is not rare, when during the healing of a fracture the child suffers from some intercurrent febrile disease, such as scarlet fever or measles. With the restoration of the general health, the process of repair about the fracture goes on as though it had not been interrupted.

General Treatment of Fractures in Children.—The general principles governing the treatment of children's fractures are the same as in the case of the adult. Accurate reduction and subsequent fixation, with the lightest restraining apparatus possible, are the main points to be considered. The difficulties in the way of accomplishing this, depend upon the soft and yielding tissues of the child, and the delicate skin, which chafes on very slight provocation. The retention apparatus can be removed a few days earlier than is safe with the adult, always cautioning parents to prevent fresh injury, since the bone is weak at the point of union for several months. From neglect of proper precautions, we have seen a fracture reproduced three or four times in half a year.

The application of fixed dressings shortly after injury is, as a general rule, more objectionable than a similar treatment in adults, since the tissue of the child is more susceptible to undue pressure, and the swelling resulting from an injury is proportionately greater. In certain regions and under certain circumstances these dressings are to be preferred above all others. The good results which may be obtained by them are shown by the records of subcutaneous osteotomies. We are not familiar with any accident following this operation which can fairly be attributed to the plaster-dressing.

Fractures of the Humerus.—Of two hundred and fifty-six classified fractures of the humerus, one hundred and forty-nine were about the condyles; eight are put down as epiphyseal. The few fractures of the shaft or surgical neck that we have seen have been dressed by placing a sheet of lint between the arm and the side of the body to prevent the maceration which always follows holding two skin surfaces in apposition. A light felt or binders' board shoulder-cap extending to the condyles was next applied, was secured by a few turns of the roller, and the humerus was then strapped to the side by broad straps of surgeon's resin adhesive plaster, the dressing being completed by a circular bandage around the arm and body, and a sling supporting the wrist. In all fractures of the humerus we have applied a primary roller to the axilla, cautioning the parents to bring the patient to the hospital immediately if the fingers become congested, or if the dressing seems to occasion pain. In addition we always inspect these fractures daily for a week, making the primary roller follow the swelling. The dressing is removed about the twenty-fourth day, the arm being carried in a sling for an additional week.

For fractures about the condyles, we use the internal or anterior angular splint. For some of the condyloid fractures, we prefer the obtuse angles, or, in certain cases, even the straight splint, since union with less deformity is obtained. In the great majority of these cases the internal or anterior right-angled splint will give perfect results. In some few the condyle will be pushed upward and back-

ward, and will be separated more widely from its base if the arm is flexed. Extension will, however, bring it accurately in place. Such cases should be treated in the extended position. The great objection to this is, that should anchylosis occur, the patient is left with a comparatively useless arm. In none of our cases, however, has this unfortunate sequel resulted. In some cases there is a forward projection of the condyle, which, should the bone heal in this position, will interfere with flexion. It is well in such cases to carry ether to the stage of primary anæsthesia, completely flex the arm, and bind it for a few days to an acute-angled splint. This should be done towards the end of the second week. We usually removed the splints in less than three weeks in these cases of condyloid fractures, at once beginning passive and active motion and vigorous manipulation.

When the motion is distinctly limited after removing the splints, ether should be given to the primary stage of anæsthesia, and the motion should be a little more forced than would be made without ether. Violent breakings up of periarticular adhesions are to be avoided, since inflammatory reaction promptly counteracts the good accomplished. This forced motion under ether may sometimes have to be kept up twice a week for one or two months. Children greatly prefer this method to forced manipulation without anæsthesia.

When vicious union or growth of osteophytes interferes with free motion, the only result is resection of the obstructing bone. In some cases we have had slight limitation of flexion and inward bowing of the elbow. The limitation of motion was due to refusal of the patients to submit to treatment.

Clavicle.—In twenty-three cases taken from the Out-Patient's Department of the Children's Hospital, where the seat of the injury was specified, in twenty-two it involved either the middle or outer thirds, or the junction of the two. In the majority of cases the right clavicle was the one broken. Green-stick fracture is occasionally seen in this bone.

At first sight it would seem that fracture of the clavicle should be rare in children; the bone is short, thick, freely movable, and protected from direct violence. The slight force transmitted by the trifling falls of childhood would seem scarcely sufficient to explain the frequency of the lesion. The bony centre for the shaft of the clavicle, however, appears earlier than that of any other portion of the body, so that at birth the bone is completely ossified. In this fact is to be found the explanation of the frequency of these fractures. The deformity is practically the same as in the adult.

Frequently very young children will exhibit almost no disability, raising the arm of the injured side to the head, and flinching not at all till the seat of injury is found. This fracture often results from an injury which would seem altogether inadequate, such as a lift of the body-weight by the wrist or a slight fall on the shoulder.

Since co-operation upon the part of the patient cannot be relied upon, a dressing must be applied from which the patient cannot get free. We have used surgeons' resin plaster, placing the arm in the Velpeau or in any other position which best overcomes deformity, and securing it in place by means of broad strips of plaster. The strap which pulls the shoulder upward and backward should have an opening to receive the olecranon, and about this opening a little cotton should be placed. Maceration of the skin must be guarded against by placing a sheet of lint between apposed skin surfaces.

Sometimes the fracture must be held in place by compresses, one behind the scapula, the other placed over the projecting outer extremity of the inner fragment. In quiet children the Velpeau bandage without straps will sometimes secure perfect apposition. These cases should not be treated by any single dressing, but rather the position should be found which holds the fragments in best apposition; then, by means of straps and bandages, this position should be made permanent. We believe that the dressing which will most frequently fulfil this requirement is either the Sayre or the plaster-of-Paris dressing placed over a flannel roller, and allowed to harden while the child is lying flat on its back, and the fragments are held in place by means of compresses secured beneath the plaster, one holding the angle of the scapula, the other placed over the projecting inner fragment. If the skin becomes irritated by the resin plaster, or chafed or abraded, the raw places are covered with zinc ointment, and a roller bandage or the plaster-of-Paris dressing is applied.

The dressings are removed about the end of the third week, a sling for the wrist being worn an additional week.

Fracture of the Femur.—The shaft was generally involved in the one hundred and thirty-five cases collected. Contrary to what is seen

in the adult, the deformity is slight or wanting. This is due to the feeble muscles of the child. Extension is often unnecessary, a simple retentive dressing being sufficient. Splints applied to the thigh direct, the long straight external splint from axilla to foot, and a short internal splint retained by plaster, the plaster-of-Paris dressing, or, in children over 6 years of age, extension and sand-bags, give good results. In very young children, extension is rarely necessary, as shortening does not occur to any appreciable extent. In these we employ either a light moulded splint applied to the anterior aspect of the thigh, or three small splints, and over this a light plaster-of-Paris or dextrine bandage from the foot to the waist. To avoid soiling by urine, this dressing can be shellacked, or ordinary cement can be used instead of the plaster. The dressing must be carefully watched to see that it becomes neither too tight nor too loose. In the latter instance angular union may result. The dressing can be removed in five weeks, a short, tight binder's board splint being employed for still a week.

Bones of the Forearm.—Of over four hundred fractures of the bones of the forearm, in considerably more than half both bones were broken. These fractures exceptionally involved the ulna alone, and there were ten cases of fractures of the olecranon, though usually violence applied at this point results in splitting fracture of the condyle. Green-stick fractures are most frequently encountered in these bones, the clavicle falling far behind in the number of cases observed. The fracture was usually caused by direct violence, and was in the main placed about the middle of the bone or upper portion of the lower third. Even when the radius alone was involved, the bone was mostly broken about the middle. It is worthy of note that, though a fair percentage of Colles's fractures occurred in children (seventy out of three hundred and seventy-five), the number was by no means commensurate to that which would have been noted in an equal number of forearm fractures in the adult. This is explained by the fact that the Colles fracture is due to a cross-breaking strain, incident to the weight being suddenly thrown upon the hand carrying the latter to a position of extreme extension, and by the tension thus excited upon the anterior wrist ligaments causing the bone to break at or above the position of the insertion of the latter. In children the ligaments are yielding, and the muscles of the arm are so weak that in a fall they give, thus relieving the radius of the cross-breaking strain. In corroboration of this, we find that the Colles fracture is much more common in children about the ninth or tenth year than it is in those who are younger.

In our cases of fractures of the shaft of the forearm, the breaks were more inclined to be transverse than similar injuries in the adult. There was either no displacement, or, if any was present, slight traction and manipulation easily corrected it. Preternatural motion, except in green-stick fractures, was the most constant sign. Frequently no crepitus could be detected, at least by the gentle manipulations which were sufficient to establish a diagnosis. The Colles fracture, however, was an exception to the general rule. The displacement was usually marked, the lower fragment being tilted backward on the upper, and at times so firmly impacted that replacement was most difficult. We believe that in such cases ether should be given, and the fragments put in proper position by forcible traction and direct pressure. Once back, there is little tendency to recurrence of deformity, the transverse, jagged sections of bone dovetailing in with each other, and holding so firmly that almost any dressing will suffice to accomplish a cure. This fracture is often never set; the resultant deformity and interference with function is so marked that, if such a case is seen within a month, an effort should be made to rebreak the bone and replace it in its proper position. If seen later, an osteotomy may be required.

We have encountered no epiphyseal fracture of the radius.

We have dressed the forearm fractures with two straight, thin splints, wider than the widest part of the bone, and extending, one from the internal condyle to the tip of the finger, the other from the external condyle to the metacarpo-phalangeal articulation. These splints are well padded, are fitted to the arm, the hand of the injured side being kept midway between pronation and supination, and are held above and below by the two hands of an assistant, while the surgeon applies the roller bandage. The forearm is then suspended in a handkerchief bandage, affording support from the elbow to the wrist. The dressing is inspected every day, and is removed every other day for a week, the surface of the forearm being bathed with alcohol at each change of dressing. After a week the dressing is changed once in three

or four days till about the twenty-fourth day, when, if gentle manipulation shows union, a short-moulded pasteboard splint is applied about the seat of fracture for still a week, the arm being carried in a sling, and the patient being encouraged to move the fingers and wrist. At about the end of the fourth week all apparatus is discarded, and the parents of the child are given a stimulating embrocation, such as soap liniment, and are instructed to rub the forearm five minutes .night and morning till no pain, tenderness, or disability remains.

When a Colles fracture is encountered, and is reduced, a Bond splint is applied, and the bandage is so put on that the patient can move the fingers. This he is told to do at once. In a little less than three weeks the splint can be thrown aside, and the patient can use the arm and have the wrist-joint rubbed and manipulated twice daily.

Sometimes the fat, conical arms of very young children escape from the two straight forearm splints unless a dangerous amount of pressure is employed. This may be prevented by fastening the dressing to the upper arm by adhesive strips, or, better still, by applying an internal or anterior angular splint with a moulded pasteboard trough extending above and below the seat of fracture. If the fracture is in the upper part of the radius, the anterior angle of the anterior angular splint, since it cannot fit close to the flexure of the bony elbow, on account of the biceps tendon, is liable to act as a fulcrum, occasioning backward bending. This may be prevented by careful padding of the lower part of the splint, by employing the internal angular splint, or by applying a moulded pasteboard or felt splint, covering the posterior aspect of the arm and forearm, holding the elbow flexed at a right angle, and reinforced by a short, straight, anterior splint.

Fractures of the Tibia and Fibula rarely occur, except as the result of direct violence. The treatment is conducted on the same lines as in the case of adults, except in infants under two years of age. With these, moulded or plaster-of-Paris splints fulfil all the indications. Potts's fracture is rare in children.

In all we have collected 1372 cases of fracture in children under twelve years of age. These were taken from the records of the Pennsylvania Hospital and of the Children's Hospital of Philadelphia.

The radius was broken in 365 (23.3 per cent.). Of these, in 177 the fracture was of both bones. In 186 the radius alone was involved.

The humerus was broken in 300 (21.8 per cent.).

The clavicle was broken in 282 (20.5 per cent.).

The femur was broken in 135 (9.8 per cent.).

The tibia was broken in 107 (7.7 per cent.). Of these, in 55 both tibia and fibula were broken. In 52 the tibia alone was involved.

The ulna (alone) was broken in 51 (3 4 per cent.).

The fibula (alone) was broken in 13 (.9 per cent.).

Taking breaks of single bones, we find the radius most frequently broken in children (23.3 per cent.); next in order comes the humerus; next the clavicle; next the femur; then the tibia.

Comparing these results with Willard's tabulation of the Pennsylvania Hospital cases from 1830 to 1874, the very great majority being adults, and numbering in all 8667, we find that the tibia was the bone most frequently broken (21.7 per cent.). After this follows the radius (18.3 per cent.); then comes the femur (13.7 per cent.); next the humerus; and finally the clavicle.

Out of 473 cases of fractured radius, mainly in the adult (less than three per cent. were children under ten), there were 371 (78.4 per cent.) Colles's fractures. Of 365 fractures of the radius in children, 74 (20.2 per cent.) were Colles's fractures.

In regard to fracture of the femur, this is generally believed to be more common in children than any other fracture. This error is due to the fact that statistics are usually taken from the cases kept in the hospital, out-patients not being recorded. It is, of course, unnecessary to keep in the hospital a child suffering from no more serious injury than fracture of the radius. Should the femur be broken, and should the child be five years of age or upward, hospital treatment is often imperative. In Willard's table, out of 868 fractures of the femur, 152 were children under ten. Similarly, the house records of the Children's Hospital show 58 fractured femurs out of 135 fractures in general. Taking the dispensary record, however, it is at once seen that fractures of the femur are less numerous than those of a number of other bones. In adults, fractures about the neck of the bone are common,—167 cases in 768 fractures of the femur (21.7 per cent.). In

our collection of cases, out of 107 fractures of the femur, we found but one recorded in which the neck of the bone was involved (.9 per cent.).

Aside from the early ossification of certain bones, we believe the reason that fractures, in regard to their frequency in certain regions, do not in children coincide with those observed in adults, is mainly due to the different forms of violence which cause these injuries, and to the fact that the imperfect muscular development of the child can neither of itself occasion a break, nor, on the other hand, materially assist in distributing force so that it is not concentrated on individual bones. Certain it is that, as children become older and more muscular, these fractures conform more closely to the types observed in adults.

We have before stated that we considered epiphyseal fractures in a healthy child of rare occurrence. During the active growth of a bone, however, fracture just above the epiphysis, or in its immediate neighborhood, is by no means uncommon. This is constantly observed in children about the elbow; rarely about the knee.

Of the four cases of fractured ribs recorded, we observed but one. This was in a child aged 5, and was the result of a crushing fall. The fracture was placed at the vertebral angle. The child died in two days.

Of the one hundred and six cases of fractured patella contributed by Willard, none were observed in children under ten. In our tables (under twelve) no case is recorded. This is undoubtedly due to the late ossification of the bone, the process sometimes not starting till the third year.

In regard to the influence of sex upon fractures in children, about seventy-five per cent. of all cases were males. This is, of course, attributable to the greater activity of boys.

SURGICAL TREATMENT AND PATHOLOGY OF AFFECTIONS OF SEROUS CAVITIES.

REPORT OF EIGHT CASES OF EMPYEMA, SIX CASES OF TUBERCULAR PERITONITIS, AND TWENTY-ONE CASES OF HYDROCELE.

By Ernest Laplace, M.D., Philadelphia.*

SINCE the anatomy of serous cavities is constant, it follows that the principle underlying the cure of affections in any locality lined by serous membrane must be the same, whether pleura, pericardium, peritoneum, or tunica vaginalis. Any inflammation violent enough to have given rise to suppuration will end, or, in other words, the cure will only be obtained, by the total obliteration of the serous sac. To reach this result two great principles must be constantly held in view. The first is drainage, and the second an aseptic condition, whereby the efforts of nature in the formation of granulation tissue will avail, and the least possible number of white blood-corpuscles be destroyed and transformed into pus by micro-organisms.

The type of such a condition would be a case of pleurisy, with effusion, wherein, after the absorption of the fluid, the pathological condition subsides by the union of the costal with the pulmonary pleura. In tubercular peritonitis—the most tractable form of peritonitis—a disappearance of the affection results when possibility is given for the obliteration of the pus-holding cavity. In the hydrocele, we find that the so-called radical cure is to be obtained only by such measures as result in chronic inflammation, whereby the cavity of the serous sac is obliterated.

The two conditions above mentioned being reached, sound hygienic measures remain as the only supplement to the treatment. Without going into any historical account of the treatment of affections of serous sacs,—for these are varied, and necessarily so, according to the various steps through which medicine has progressed,—we will briefly describe the changes that actually take place in the serous membrane; study the fluids incident to the disease; the removal of this fluid, and the subsequent changes in the serous walls; the building of fibrous tissue; the cure.

A fibrous layer lined by pavement epithelium is the essential portion of a serous membrane; below it blood-vessels, ramifying in a horizontal direction, near the fibrous layer, supply nutrition to the membranes. Granted an irritation, such as would naturally follow the action of cold, a congestion soon results, whereby the serous portion of blood exudes from the surface of the membrane, so that the stage following the congestion is necessarily one of more or less exudation. This highly nutritive culture medium requires but the access of a few micro-organisms—generally through the blood—to develop and form enormous colonies. Ptomaïnes result, irritation is increased, followed by increased secretion, more culture medium, more development of bacteria, until so great is the amount

* Professor of Surgery, Pathology, and Clinical Surgery in the Medico-Chirurgical College; Surgeon to the Philadelphia Hospital.

of ptomaïnes that the death of white blood-corpuscles follows, and the formation of pus is the result.

Such is the course of an acute infection of a serous sac. The epithelium is destroyed, and, granted a once suppurating serous surface, this must necessarily be devoid of its epithelium. In subacute and chronic cases, conditions necessarily demand a slower process, whereby the congestive stage is continuous, the irritation being mild and constant, and at no time violent enough to destroy the migrating white blood-corpuscles. In these cases, therefore, the affection is limited to an exudation, such as is found in simple pleurisy with effusion and hydroceles, where the condition is of a true chronic character. These conditions, such as above described, are general,—that is, although different cases might apparently answer such a description, still many and varied may be the causes that have started the processes and are still at work. The various streptococci of suppuration are nearly always present, these forming in the vast majority of cases the primary infectious element ; in other words, a condition similar to an abscess or a furuncle has developed over the whole surface of the sac.

Often, however, the tubercle bacillus gradually invades a primarily irritated surface of serous membrane, and developing, becomes the cause of a mass of pus there collected, which pus may be apparently free from any micro-organisms ; not entirely, however, for even in such cases, should a small amount of this pus be injected into guinea-pigs, they will at the end of one month show unmistakable signs of tuberculosis. Whatever be the initial cause of the affection, it remains true that the condition to be aimed at for the cure is the same,—*i.e.*, thorough drainage and disinfection, together with subsequent formation of fibrous tissue.

To illustrate this principle, which I purposely place as concisely as possible, bringing little else to bear in any collateral way, that the principle may remain fixed and guide us in all affections of serous sacs, I will describe the following cases, most of which have occurred in the wards of the Philadelphia and Medico-Chirurgical Hospitals during my terms of service in 1890, 1891, and 1892,—eight cases of pyothorax, six cases of tubercular peritonitis, and twenty-one cases of hydrocele. Without going into a detailed history of each case, I will mention simply such points as will bear more particularly upon the special mode of treatment.

Case I.—*Pyothorax.*—Laborer, aged 49 ; no family history ; had pneumonia two years ago ; for three weeks has suffered violent pains in the right side. Morning temperature, 100° F. ; evening, 102° F. Diagnosis of pyothorax being made, a resection of the sixth rib was practised in the axillary line. An incision three inches long having been made directly on the rib, it was exposed to the extent of two inches, and about one inch was removed by means of the costatome. A large amount of pus was evacuated, thick and yellowish in character. The pleural cavity was then thoroughly washed with sterilized hot water until the liquid came away quite clear. A large piece of iodoform gauze was twisted in the fashion of a rope, and was packed into the cavity as far as could be reached with a long silver probe. The patient rallied easily from the operation. Temperature did not rise above 100° F. subsequently. A large amount of sero-pus drained off from the cavity. The packing was renewed every two or three days. The patient's condition improved rapidly ; appetite returned. Two months after the operation the wound had entirely closed, without the presence of a sinus.

A small amount of the pus withdrawn from the pleura at the time of the operation was injected into a guinea-pig, causing the death of this animal from septicæmia.

Case II.—Young man, aged 21 years ; tubercular antecedents ; no history of previous disease. During the past two weeks has suffered with pain in the right side, and gradually developed an area of dulness, which presented but little vocal fremitus. Evening temperature, 102° F. ; morning, 99° F. An inch of the sixth rib being removed, in the axillary line, about one-half pint of thick, creamy pus was evacuated. Careful irrigation with hot water, and subsequent packing of the cavity with a long strip of iodoform gauze, followed ; during three weeks packing was renewed twice a week. The discharge, which was at first profuse and purulent, had gradually lessened, and was now of a clear appearance. At no time did the patient complain of pain from the packing. When he left the hospital, eight weeks after admission, he still retained a slight fistula, from which a little oozing took place. The patient had gained ten pounds from the date of the operation.

A small amount of pus from his pleura

being injected into a guinea-pig produced death by acute infection.

CASE III.—Sailor; aged 36; presented the symptoms of accumulation of fluid within the left pleura; temperature 101° F. in the morning, 104° F. in the evening; respiration, 30; pulse, 110; apex-beat of the heart felt a little to the left of the ensiform cartilage. Under ether a similar resection of the sixth rib, in the axillary line, was performed, and a careful flushing of the pleura practised with sterilized hot water. This was followed by thorough packing with iodoform gauze as far as could be reached with a long probe. The reaction after the removal of about a pint and a half of pus was prompt. Drainage took place with the greatest facility, an average of at least two or three ounces of fluid being drained off from the thorax daily. Recovery was rapid, and at the end of one month after the operation there ceased to be any discharge from the wound, and the patient left the hospital cured.

CASE IV.—A woman, aged 40; alcoholic; syphilitic antecedents; had pneumonia one year ago; presents general dulness on the right side, together with diminished vocal fremitus; respiration, 30; pulse, 100; temperature, 103½° F.; no evidence of any active syphilitic manifestations. Four days after admission, resection of the sixth rib, in the axillary line, was practised, and the wound was packed with iodoform gauze. No pain resulted; but, on the contrary, she felt, as she expressed it, "a sense of support on that side." The oozing was abundant, but less so with subsequent dressings, which were renewed twice a week. This patient's case was complicated by a violent attack of diarrhœa, which seemed to retard her progress towards cure. However, at the end of nine weeks she left the hospital, apparently well.

CASE V.—A boy, aged 14; very much emaciated, and of tuberculous parentage; has a hectic flush; coughs incessantly; no appetite; right side bulging somewhat; diagnosis, a pleural effusion. A resection of the sixth rib, in the axillary line, was practised, and about eight ounces of thin, yellowish fluid was withdrawn. In this no microorganisms could be detected microscopically. About one drachm of this pus, however, being injected into a guinea-pig caused in the animal the development of tuberculosis of the lymphatic glands of the abdominal cavity, as well as tubercular deposits in the liver and lungs, leaving but little doubt that in this case the pyothorax was really a tuberculosis of the serous membrane. The same system of packing was resorted to, but without the same rapidly beneficial effect. The secretion of pus seemed to continue unabated for one month. Finally, it decreased, and when the boy left the hospital, two months after admission, a large sinus still existed. Further trace of the case was lost.

CASE VI.—A man, aged 60; very emaciated; dulness over both lungs; diagnosis of tuberculosis of the left lung, tuberculosis and pleural effusion of the right thoracic cavity. In spite of the desperate condition of this patient, owing to great dyspnœa, it was deemed necessary to increase his respiratory capacity by the operation of section of a rib. The patient stood the operation without marked shock. Packing of the cavity was resorted to, but no improvement seemed to follow, and death resulted within four days after the operation. The autopsy revealed large tubercular deposits in both lungs, together with a thickened pleura, lined with tuberculous membranes.

CASE VII.—Female child, aged 8 years; bright, but delicate; respiration, 30; temperature, 102° F.; has considerable pain in the left side. Auscultation revealed the presence of fluid, which, owing to the child's delicate appearance, was removed by means of the trocar. The fluid proved to be yellowish green in character, and somewhat purulent. Twelve ounces of it were removed, and in a week the distention of that side appeared almost as great as it had been at first. Resection of the sixth rib was then performed, and the cavity packed with gauze, this time about a pint of fluid being removed. The child was placed on the syrup of hypophosphites, and apparently progressed towards recovery. She was seen a year later, and auscultation revealed a marked diminution of respiration over the once affected area, giving evidence of an adhesion of the lung to that side.

CASE VIII.—Male, aged 45; much emaciated, and giving history of chronic articular rheumatism; temperature, 102½° F.; pulse, 100; respiration, 30; dulness of the right side and diminished vocal fremitus directed our attention to an effusion. The patient at first refused an operation, but after a week's aggravation of the case, finally consented. Two pints and a half of a rather offensive fluid pus were removed, the effusion, no doubt, having been secondarily infected by some saprogenic germ. The same system of packing and draining with iodoform gauze was resorted to; the wound was redressed twice a week;

general tonics were administered. One month after the operation the patient left the hospital, apparently cured.

Tubercular Peritonitis.—Six cases came under my observation, of which, four were men and two women.

CASE I.—A laborer, aged 25; has a continued hectic flush; slight deposits in the apex of the left lung; tubercular antecedents. A marked fluctuation was detected in his distended abdomen. After one month's duration of the case, a two-inch incision was made in the median line, midway between the umbilicus and arch of the pubis; the peritoneum was opened to the extent of two inches, and fully two quarts of pus were removed; the abdominal cavity was flushed with a large amount of water, and drained with iodoform gauze. The patient's temperature subsequently was never above 99½° F. Appetite improved, as well as the general symptoms. A month after the operation the patient was able to leave the hospital.

CASE II.—A woman, aged 40; no previous history; husband died of tuberculosis six years ago; has been suffering with obscure pains about the abdomen; night-sweats; fluctuation barely to be detected. An incision being made into the abdominal cavity, in the median line, about two pints of pus were removed, the cavity was carefully flushed with hot water, and a large iodoform drain applied. Improvement immediately followed, which resulted in a complete cure at the end of three weeks.

CASE III.—A woman, aged 25; married; had a child six months ago. Three months ago began to suffer obscure pains in the right iliac region, which gradually spread over the rest of the abdominal cavity; abdomen began to distend; no interruption in her menstrual periods; temperature, 102½° F.; fluctuation slight. An incision being made in the linea alba, about a pint and a half of thick pus was removed; the abdominal cavity was carefully washed with hot sterilized water, and an iodoform-gauze drain was applied. Copious saline cathartics were given. At the end of two weeks suppuration had ceased, and an uninterrupted recovery took place.

CASE IV.—A laborer, aged 30; father and mother died of tuberculosis; has been well, though not strong, until six months ago, when there were obscure pains about the abdomen, and gradual distention took place; at present has night-sweats and occasionally chills; pain quite marked on pressure over the region of the abdomen; no tympanites. An incision in the median line liberated about one gallon of thin, yellowish pus. A large amount of organized fibrin was also evacuated, and a small portion of protruding tubercular omentum was excised. This patient seemed very much exhausted from the operation, and never fully rallied, though he did not die until the fourth day after the operation. It was unmistakably—as the post-mortem revealed—a case of disseminated tuberculosis, to which the operation seemed to give an acute turn, and which was the climax of a progressive tubercular condition of the lung.

CASE V.—Boy, aged 6 years; great distention of the abdomen. There was dulness, and a slight suspicion of fluctuation. An incision was practised, and about eight ounces of pus were removed. This seemed to relieve the condition, for no complication followed. The gauze packing was removed on the tenth day, and gradual recovery took place. The child had kept well six months after the operation.

CASE VI.—Laborer, aged 52; has not been well for several years; very much emaciated; abdomen tympanitic in places, but dull on the anterior surface; hectic; night-sweats; loss of appetite; dulness at the apex of the right lung. An incision being practised in the median line, about ten ounces of pus were removed, the cavity flushed, and an iodoform-gauze drain applied. After the usual treatment, the patient left the hospital cured.

Hydrocele.—It would be tedious to relate the details of the twenty-one cases that we have collected during our three years' service. Suffice it to say, that in no case was the hydrocele attributed to other than the ordinary causes. They existed in patients ranging from 15 years of age to 85, from the size of a walnut to the size of a child's head. In every case, knowing the absolute necessity of a radical cure, the radical treatment was applied,—viz., in eight cases the puncture and subsequent injection of irritating substances, such as combined tincture of iodine, one drachm, or carbolic acid, ten drops, or a saturated solution of chloride of zinc, half a drachm.

In all of these cases pain was excruciating, swelling enormous, and withal, though ultimately followed by cure after the subsidence of the violent acute inflammatory condition, it must be admitted that the treatment was violent and almost unbearable. In the treatment of our subsequent cases, however, we departed from this custom, and to obtain the

same result applied rather the treatment similar to that which we had found so successful in corresponding conditions of other serous membranes,—*i.e.*, free evacuation by means of an incision, and subsequent packing of the serous sac by means of iodoform gauze, whereby drainage, disinfection, and a certain amount of irritation might be kept up. The iodoform gauze was irritating enough to promote the condition of chronic inflammation, whereby granulations would be formed, which would result in the joining together of the serous surfaces, such as we agreed was absolutely necessary for the final cure of the condition; but over and above this, the opening caused by the incision and the presence of the iodoform gauze afforded the best possible conditions for drainage, thereby avoiding the possibility of the violent reactionary inflammation and swelling, such as took place in the methods of treatment by the injection of violent irritating substances.

In every case thus treated, whether the hydrocele was recent or chronic, the result was uniform,—a gradual obliteration of the sac, until, finally, the wound itself healed and closed, without at any time, from the moment of the operation, presenting the least pain. The packing with iodoform gauze was renewed twice a week, and in five cases a complete cure had taken place within two weeks; in the remainder, within three weeks, results of which cannot be found with any other method of treatment; for we know that irritating injections, violent and painful though they be, do not always achieve a cure, owing to the amount of exudation which remains unobserved in the sac we are trying to obliterate.

The following is the mode of procedure which we propose, placing perfect drainage as the main condition of success. The hydrocele is grasped firmly in the left hand and made tense. A free incision is made into the sac, and when the serous surface has been thickened, as occurs in cases of long standing, gentle scraping is made with the sharp spoon. Packing with iodoform gauze is then resorted to, bringing the parts to about the same size as the original hydrocele. The iodoform acts as an antiseptic and gentle irritant, promoting the formation of granulations. Drainage is carried on perfectly, hence no swelling or pain at any time. This packing is removed every three or four days. The surfaces are then covered with granulations, and it takes but moderate compression by a bandage to cause adhesion of these granulating surfaces, hence obliteration of the sac and final cure of the hydrocele. The outer wound soon heals by granulation, and at no time is there any pain. We read that Heister,* in the last century, proposed a free incision and stuffing the cavity as one of his five plans of treating hydroceles; of this fact we were not aware until quite recently, and it might thus seem that medical methods unconsciously move in a circle. But in those days the principles of drainage, antisepsis, and tissue-genesis were not understood; to-day they form the tripod of modern surgery, illustrating the dictum of Sir James Paget, that "medicine does not move in circles, but in the windings of an ever-ascending spiral."

A CASE OF PNEUMONIA TREATED BY TRANSFUSION OF BLOOD FROM A CONVALESCENT CASE.

By W. E. Hughes, M.D.,† and W. S. Carter, M.D.‡

ACQUIRED immunity from the acute specific febrile diseases has long been a subject of deepest interest, and to explain it theories more or less probable have been advanced. It is only now, understanding, as we do, more fully the true nature of these diseases as the result of bacteriological investigations, that we are beginning to be able to explain rationally this curious fact. And the explanation carries with it something of far greater moment than a mere scientific solution of a vexed problem. It presents the possibility of prevention, or even of cure, of this class of diseases. It is along this line of the production of immunity that we must look for advance. We are upon the threshold of great discoveries. The day is dawning when we shall cure disease, instead of, as heretofore, guided only by empirical and often fallacious experience, endeavoring feebly to aid the *vis medicatrix naturæ*, like the blind groping in the dark.

It is not necessary here to review the moot question of the nature of pneumonia. Suffice it to say that it is now conceded, by probably the majority of investigators, to be of bacterial origin. It offers, by its sudden and clear-cut onset, its definite course, and its termination by crisis, one of the best fields for the

* Quoted by Packward, *Canadian Practitioner*, February, 1889.

† Visiting Physician to the Philadelphia Hospital.

‡ Demonstrator of Experimental Physiology in the University of Pennsylvania.

determination of the possibility of cure by the production of an artificial immunity.

About a year ago G. and F. Klemperer* found that rabbits vaccinated by cultures of varying strength of pneumococci in bouillon had become immune, injections of the most virulent cultures producing no effect. From cultures they isolated a substance,—an albumose pneumotoxine,—which, being injected into rabbits or into men, produced febrile symptoms similar to those of pneumonia. In animals previously rendered immune by vaccination, the injection of pneumotoxine had no effect. In addition they found that the effect of injection of cultures of pneumococci was promptly antagonized by the injection of serum of men rendered immune by a recent attack of pneumonia. The time that had elapsed in the men from whom the serum was obtained, after the crisis, varied from one day to three months, and in all these cases the same results followed the injection of the serum. The serum was obtained by venesection or by blistering, and was equally efficacious in either case. The explanation of these facts was that the blood of immune persons contains a substance, which they called antipneumotoxine, antidotal to the pneumotoxine, developing during the course of the disease, owing to some action of the pneumotoxine upon the serum, until it is present in sufficient quantity to neutralize the pneumotoxine, and thence persisting during the period of immunity.

E. Mosny† confirmed these observations, and determined additionally that, while serum from an immune animal aborted the effect of pneumotoxine, vaccination practised subsequently to inoculation with a virulent culture had no such effect, the animal invariably dying. This points to the probability that the substance conferring immunity is not identical with that antidoting the pneumotoxine, and thus bringing about a cure, but that the former generates the latter. These substances have not been isolated.

The Klemperers, in the paper above referred to, present also the results of their investigations upon men. In the six cases of pneumonia which they injected, the crisis appeared in from six to twelve hours after the injection, with slowing of the pulse- and respiration-rate. In two cases the temperature remained normal; in others it rose again, on the average, in six hours, to fall a little later on. In two cases complicating typhoid fever, the temperature curve of the typhoid fever was not affected. The quantity of serum used in these cases was from four to six cubic centimetres; it was injected subcutaneously.

Neisser‡ reports three cases of pneumonia in men treated by injections of serum. The first case had pneumonia, involving the lower lobe of the left lung, and was injected on the third day of the disease with one hundred and thirty cubic centimetres of serum, taken from a case of pneumonia two days after the crisis. The temperature fell at once. The second case had also the left lower lobe involved. It was injected with seventy cubic centimetres of serum, taken two days after the crisis. The temperature did not fall here till two days after the injection. A week later a pleural effusion developed, which was tapped, the patient afterwards making a prompt recovery. In the third case, in the course of an attack of influenza, there was a sudden chill, and the presence of virulent diplococci, with the other phenomena of pneumonia. An injection was made, immediately after the development of these symptoms, of fifty cubic centimetres of serum, obtained by tapping the pleural effusion in the second case, after which the temperature suddenly subsided, and there was rapid improvement, with, however, a slight pleural effusion.

In twenty cases reported by Redner, and referred to by G. Klemperer,§ a uniformly favorable result was obtained. In twelve an injection subcutaneously of from five to ten cubic centimetres of immune serum was made. In five of these, however, it was considered doubtful that the good result was due to the injection, the histories being such as to make it possible that the fall of temperature marked the natural crisis. In the remaining eight bouillon cultures were used. In all of them the temperature fell promptly, but in some this fall was only temporary, it rising again in a short time. In those cases where the temperature rose again, the injections were repeated until the normal was preserved. These cases were of all grades, some of them being of exceptional severity.

C. Janson‖ has reported some favorable cases, but his original paper not being at

* *Berl. Klin. Woch.*, xxviii. p. 869.

† *Arch. de Méd. Expèr. et d'Anat. Path. Par.*, 1892, iv. pp. 195–244.

‡ *Deutsch. Med. Woch.*, 1892, xxv. p. 593.

§ *Wien. Med. Woch.*, 1892, xii. p. 882.

‖ "Acute Pneumonia treated by Blood-Serum from Inoculated Animals." Hygeia, Stockholm, 1892, liv. pp. 368–377.

hand, we are, unfortunately, unable to quote it.

The present case we have reported at some length, seeing that the previously-reported cases are lacking in many of the minor details. The history of the case from whom the blood was obtained is as follows:

Henry H., aged 24 years; negro; laborer; no tubercular or syphilitic history. When eight years old had pneumonia or pleurisy on the left side. July 9, while at work, and apparently in perfect health, began to have fever, with no chill preceding. The next day he began to cough and expectorate blood-streaked mucus. About this time some dyspnœa and pain in the region of the left nipple appeared. Was admitted to the Philadelphia Hospital July 13, when the following note was made. Temperature, 104° to 105° F.; pulse, 120 to 130; respiration, 35 to 40. General appearance that of a man with a disease of moderate severity. Coughs frequently, expectorating rusty sputum. Complains of sharp pains about the left nipple. Over the lower lobe of the left lung dulness, bronchial breathing, and crackling râles. The sputa contained diplococci. Slight gastro-intestinal disturbance. The urine had a specific gravity of 1016, contained a trace of albumin, but no casts, and showed diminution of the chlorides. Through the 14th and 15th his condition remained unchanged, save that he was slightly delirious. On the 16th the temperature suddenly fell, reaching, twelve hours after the beginning of the fall, 97.8° F. The pulse dropped to 90 at the same time, but there was no change in the respiration-rate, and the delirium persisted. Towards evening the temperature went up again to 102°, but the pneumonia was evidently resolving. There developed at this time some pleurisy on the left side, with probably slight effusion. By the 19th the temperature had again reached normal, and he had a very satisfactory convalescence. On the 29th three hundred cubic centimetres of blood was drawn from the left median basilic vein for transfusion. The blood, as it flowed, was whipped thoroughly, and all fibrin removed; it was then filtered through several thicknesses of gauze to further remove any small clots that might have remained from the whipping. Thorough antiseptic precautions were observed.

The history of the case in which the immune blood was injected is as follows:

John W., aged 35 years; white; huckster; health usually good; no history of tuberculosis or syphilis; irregularly intemperate; he had been drinking heavily for two weeks before the attack. July 25, at 3 A.M., while sleeping in a draft, had a severe chill, followed rapidly by marked gastro-intestinal disturbance, vomiting, diarrhœa, etc. In the afternoon he began to cough, and severe stabbing pain developed in the right side. He was admitted to the Philadelphia Hospital July 28, with the following condition. Temperature, 104° F.; pulse, 124; respiration, 36; has the aspect of a man seriously ill. Constant cough, accompanied by intense shooting pain in the right side and less severe pain in the left; expectoration rusty; microscopic examination shows it to contain numerous diplococci; tongue white coated, with red margins; appetite poor; bowels sluggish. Over the lower lobe of the right lung there is dulness, increased tactile fremitus, blowing breathing, with fine crepitant râles. This condition is sharply limited to the lower lobe, the rest of the lung being normal. At the base of the lower lobe of the left lung there is partial dulness, some increase of tactile fremitus, roughened breathing, with crepitant râles. In the evening, his temperature having reached 104.6° F., he was given plunge-baths, with the result of reducing the temperature to 101.8° F.

July 29.—Restless all night, and slept very little. Patient lies flat on his back, eyes wide open and staring, is nervous and at times delirious, with muscular twitchings. Over the right lower lobe the râles have disappeared, and the breathing is purely tubular. Over the left dulness is more pronounced and embraces a wide area; the râles are more numerous and the breathing more blowing. Urine contains a small quantity of albumin, but no casts; the chlorides are diminished. The temperature having again risen to 104° F., he was bathed, bringing about a fall of 2°.

At 10 P.M. three hundred cubic centimetres of blood, taken from the convalescent case, were transfused. A glass canula, connected by means of a rubber tube with a funnel, was used. The left median basilic vein was exposed and tied; the empty proximal portion of the vein was slit; the canula inserted in the slit and tied in; then the defibrinated blood was poured into the funnel, and permitted to force itself slowly into the circulation by gravity. But a few minutes had elapsed between the collecting of the blood and its transfusion, and it was still almost at body heat. In order to prevent any possi-

ble increase in tension, a quantity of blood equal in amount to the blood injected was drawn from the vein below the point of ligation. Before the transfusion the temperature was 101.8° F.; immediately after it, 101.6° F.; the pulse was practically uninfluenced, being possibly slightly increased in tension. Shortly after the transfusion patient had a severe chill, lasting twenty minutes, in the midst of which his bowels moved freely.

July 30.—Purged three times during the night and vomited twice. This was evidently the result of the transfusion, as the gastro-intestinal disturbance of the early part of the attack had entirely disappeared. Towards morning the stomach and bowels became quiet. Temperature oscillated between 104 4° and 100° F. during the night, till at 5 A.M., when it began to fall steadily, and by noon to-day has reached 98.4° F. Cannot sleep at all during the night, and is still somewhat delirious, but says he feels better, and certainly looks better. Pulse, 96; respiration, 30; still coughing; expectoration rusty and contains diplococci; urine shows no change; chlorides are still diminished; there is no hæmoglobinuria; physical signs in the lungs have improved; there are subcrepitant râles over the right lower lobe, and on the left the breathing is less harsh; temperature rose slightly towards evening.

July 31.—Slept none during the night; is restless, nervous, and delirious, but the resolution is progressing steadily and rapidly in the lungs; still diplococci in the sputum; temperature rose steadily, till, at 3 P.M., it had attained a maximum of 104° F. At this point there was given a hypodermic injection of morphine and hyoscine, bromides and sulphonal having previously been used without effect, when he slept, and temperature fell.

August 1.—Temperature has been falling steadily since the sleep of last night, till, at 2 P.M., it is 98.8° F.; still delirious; lungs are markedly improved; sputum contains only a few diplococci; temperature rose to 103° F. by evening.

August 2.—Had no sleep during the night; delirious; temperature ranging between 100° and 103° F.; was given another hypodermic injection of morphine and hyoscine, which produced sleep and a fall of temperature to 98.8° F.

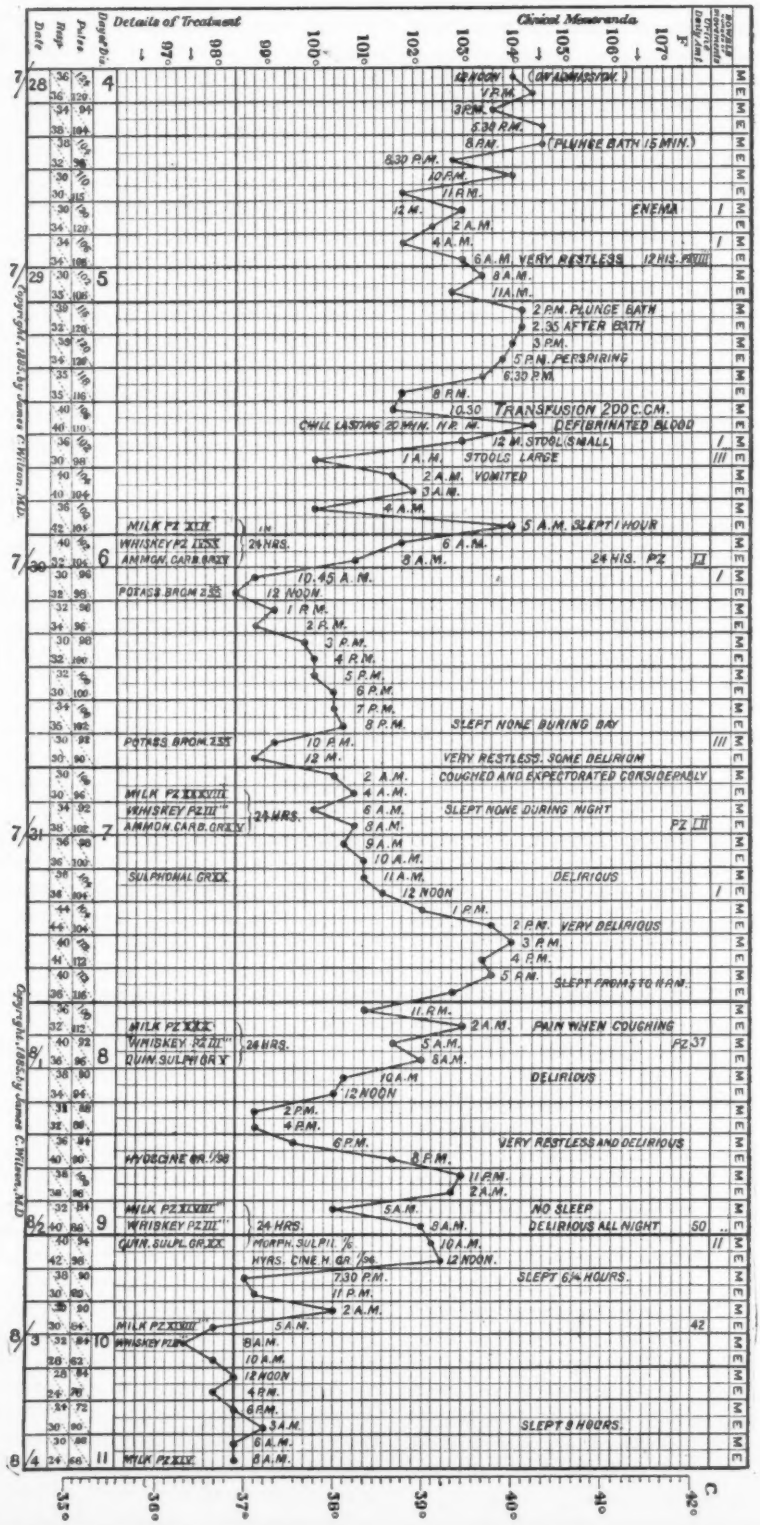
August 3.—Mind is clear; temperature normal; says he feels hungry and asks for something to eat; coughs very little, and says the pain in his side is almost gone; no diplococci in sputum. The left lower lobe is practically clear; on the right the blowing breathing has pretty well disappeared, and the normal vesicular murmur taken its place, but there are still many moist râles. The chlorides in the urine are still somewhat diminished.

From this on he made a rapid and uninterrupted recovery, being discharged from the hospital August 15.

The respirations, before the injection, averaged 35. During the period of oscillation of temperature immediately succeeding the injection they ran up, averaging 38. At the crisis they fell to an average of 31. During the secondary rises in the temperature they ran up again, falling every time the temperature fell. The pulse showed a somewhat similar variation, though in a less degree, after the crisis it was throughout slower than before. A partial deafness in the left ear developed the next day after the injection, but eventually entirely cleared up.

To Drs. Hitz and Robinson, resident physicians, our thanks are due for valuable assistance and a careful recording of observations on the cases.

Defibrinated blood, instead of serum, was used, partly with the object of determining whether there was any difference between its action and that of serum in previously-recorded cases, partly to avoid loss of time, as the earlier in a case of pneumonia is the crisis brought about the stronger is the presumption of the instrumentality of the injection in its production, and partly to establish certain facts with reference to another line of experiments, in which we are at present engaged. But its future use is strongly advised against on account of its attendant dangers. In the above-reported case there was unquestionably a very marked disturbance due to the blood, as was evidenced by the chill, vomiting, and purging immediately following its injection, and the deafness developing a little later. In fact, the symptoms, due probably to small emboli lodging in the brain, although every care had been exercised to have the blood free of clots, very seriously alarmed us at the time of their occurrence. On the other hand, serum is perfectly harmless. In cases of other diseases where we have used it in large quantities absolutely no bad results have been noticed, nor have any such results been recorded in the numerous cases in which it has been used. It seems to act perfectly well injected into the cellular tissue; but, possibly, to insure prompt action


Details of Treatment
Clinical Memoranda
Date
Resp.
Pulse
Day of Dis.
12 NOON (ON ADMISSION)
V.P.M.
3 P.M.
5.30 P.M.
8 A.M. (PLUNGE BATH 15 MIN.)
6.30 P.M.
10 P.M.
11 P.M.
12 M. ENEMA
2 A.M.
4 A.M.
6 A.M. VERY RESTLESS 12 HIS. PZ
8 A.M.
11 A.M.
2 P.M. PLUNGE BATH
2.35 AFTER BATH
3 P.M.
5 P.M. PERSPIRING
6.30 P.M.
8 P.M.
10.30 TRANSFUSION 200 C.CM.
CHILL LASTING 20 MIN. N.P. M. DEFIBRINATED BLOOD
12 M. STOOL (SMALL)
1 A.M. STOOLS LARGE
2 A.M. VOMITED
3 A.M.
4 A.M.
5 A.M. SLEPT 1 HOUR
6 A.M.
8 A.M. 24 HIS. PZ
10.45 A.M.
12 NOON
1 P.M.
2 P.M.
3 P.M.
4 P.M.
5 P.M.
6 P.M.
7 P.M.
8 P.M. SLEPT NONE DURING DAY
10 P.M.
12 M. VERY RESTLESS. SOME DELIRIUM
2 A.M. COUGHED AND EXPECTORATED CONSIDERABLY
4 A.M.
6 A.M. SLEPT NONE DURING NIGHT
8 A.M. PZ
9 A.M.
10 A.M.
11 A.M. DELIRIOUS
12 NOON
1 P.M.
2 P.M. VERY DELIRIOUS
3 P.M.
4 P.M.
5 A.M. SLEPT FROM 5 TO 11 A.M.
11 P.M.
2 A.M. PAIN WHEN COUGHING
5 A.M.
8 A.M. PZ
10 A.M. DELIRIOUS
12 NOON
2 P.M.
4 P.M.
6 P.M. VERY RESTLESS AND DELIRIOUS
8 P.M.
11 P.M.
2 A.M.
5 A.M. NO SLEEP
8 A.M. DELIRIOUS ALL NIGHT
10 A.M.
12 NOON.
7.30 P.M. SLEPT 6½ HOURS.
11 P.M.
2 A.M.
5 A.M.
8 A.M.
10 A.M.
12 NOON
4 P.M.
6 P.M.
3 A.M. SLEPT 9 HOURS.
6 A.M.
8 A.M.
MILK PZ XLII
WHISKEY PZ LXXX
AMMON. CARB. GRXXV
24 HRS.
POTASS BROM. 2.5%
MILK PZ XXXVIII
WHISKEY PZ III
AMMON. CARB. GRXV
SULPHONAL GRXX
MILK PZ XXX
WHISKEY PZ III
QUIN. SULPH. GRX
HYOSCINE GR. 1/150
MILK PZ XXXII
WHISKEY PZ III
QUIN. SULPH. GRXX
MORPH. SULPH. ½
HYOS. CINE H. GR 1/96
MILK PZ XXVIII
WHISKEY PZ III
MILK PZ XLIV
24 HRS.
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35° 36° 37° 38° 39° 40° 41° 42° C

and to guard against any possibility of non-absorption, its intravenous use would be preferable. To accomplish this the needle of the syringe might be introduced within the vein through the skin. The serum to be used would preferably be that of man. If this were not at hand, the serum of immune rabbits would be satisfactory, though, as has been suggested, that of larger animals would probably be better. The serum is easily obtained by placing the blood on ice for from twenty-four to forty-eight hours, when it will have separated from the clot. It could be prepared much more rapidly by filtration under pressure through a porcelain filter. The time during which the serum is active in cure—that is, contains antipneumotoxine—has yet to be determined. From recorded cases the pneumotoxine may certainly persist for at least three months after the crisis. The quantity of serum to be used should, we think, be at least fifty cubic centimetres, or, if smaller quantities are used and the temperature rises subsequent to the crisis, the injection should be repeated. The value of the injection of cultures has yet to be more clearly ascertained. It is probable that they will be found more efficacious in prevention than in cure.

Pneumonia, it is true, may end by crisis before the usual time. But in the present case we have a double pneumonia, which is still progressing, a case in which from the general symptoms the prognosis would be at least doubtful. And here we get a crisis promptly following the injection before a crisis could be reasonably expected under any other treatment. It seems not too much to claim that the result was directly due to the injection. The subsequent rises of temperature do not at all vitiate this claim, for they were probably due to causes connected with the injection and not with the pneumonia, as throughout them the pneumonic lungs were steadily resolving.

In all there are now thirty cases at hand, in every one of which definite results followed the injection. It is true that five of these were cases in which the crisis might have been a normal one. But, leaving these aside, there are still cases enough to at least suggest that in the blood of persons or animals, after an attack of pneumonia, there exists a substance antidotal to pneumonia. Many more investigations will be necessary before the question is definitely settled, and among them and most important of them is the isolation of the antipneumotoxine.

*A REVIEW OF SOME RECENT ADVANCES IN THERAPEUTICS.**

By H. A. Hare, M.D.†

TO deliver an address in medicine before so distinguished a body of practising physicians as the Mississippi Valley Medical Association is a task which may well cause elation at the honor conferred, and fear lest one may be unworthy of so high a place. For the moment I regretted that I had accepted the invitation of your honorable President, for I remembered the words of our medical father Hippocrates, "Rashness is evidence of unskilfulness." However, a second aphorism of Hippocrates urged me to my fate,—"Timidity indicates incapacity." I shall not attempt to-night a complete summary of the advances made in medicine during the past year, since such an attempt must fail for lack of time at my disposal in addressing you, nor shall I weary you with a dissertation on the well-worn subject of medical education or the history of medicine. With your permission I may be allowed to point out several important facts, which must modify our treatment of certain conditions dangerous to life.

It is one of the misfortunes of the day that, whereas the progress of medicine was for many years too slow, it is now too fast to permit us to keep up with all its departments, or, indeed, with any one of them. The physician engaged in an active general practice finds himself relying on the methods taught him by his preceptor, or gained by hasty readings of more or less standard authors. In many instances these authors, unable to cover the entire subject treated by them from their own experience, are forced to quote from the writings of their contemporaries or predecessors, and an error made by an author one hundred years ago may in this manner be propagated by text-book after text-book.

The first of these to which I wish to draw your attention is a method of resuscitation in emergencies arising during anæsthesia produced by chloroform or ether. In all standard text books we are told that a battery should be at hand during every operation, and, in the event of respiratory failure, one pole should be placed over the phrenic nerve in the neck and the other in

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† Professor of Therapeutics in the Jefferson Medical College of Philadelphia.

the hand or elsewhere on the patient's body. Thus Joseph Mills, in the article on "Anæsthetics," in Treve's "Manual of Surgery," directs that in chloroform accidents "the faradic current be applied, one pole to the epigastrium, the other to the right side of the neck, to try to induce the diaphragm to act." I have seen this method resorted to again and again by the ablest surgeons this country has produced, men whose methods in general and whose reputation would justify any one of us here to night in following their customs, yet a moment's thought as to the action of the faradic current in the rapidly interrupted form in which it is always employed shows us at once that to use it is to attempt to achieve something of no value. The respiratory movements of that greatest of respiratory muscles—the diaphragm—are to and fro,—a muscular contraction, like all other muscular contractions. Every one knows that a muscle firmly contracted in a tetanic rigid spasm by the application of a rapidly interrupted current is as useless as is that same muscle when relaxed by the over-action of a drug. What we desire under such circumstances is a slow contraction and relaxation of the diaphragm, such as we see in health, and the nearest approach to this is, theoretically, to be obtained by the current which is slowly interrupted. Practically, however, we find that both of these currents are worthless and, worse than worthless, are dangerous. In the first place, it is impossible to influence the phrenic nerves by any but strong currents, for the resistance offered by the cervical tissues is too great for feeble currents to penetrate them. In the second place, it is easier to stimulate the pneumogastric nerves by such a procedure than to influence the phrenic nerves; and, finally, stimulation of one phrenic nerve, as directed by most authors, only results in a contraction of one-half of the diaphragm. In conjunction with Dr. Martin, I have proved that these opinions are no idle theories, as the tracing which I have the honor to show you will indicate. Here you will notice that, though the phrenic nerves were unaffected, the pneumogastrics were sufficiently stimulated to inhibit the action of the heart, and if this inhibition had been added to the depression due to the prolonged use of an anæsthetic, or to engorgement of the ventricles, it can readily be seen that death might have resulted at once. I am told by many that they have used this method which I have condemned with great success. My answer to this is, that the results obtained, while desirable, were reached inadvertently, not directly,—that is to say, the application of a peripheral irritant to the skin caused a reflex respiratory gasp similar to that seen when a cold wet towel is applied to the abdomen. Equally good results would be obtained if the electrodes were swept over the abdomen and chest, and not pressed against the region of the phrenic and pneumogastric nerves.

The next point to which I wish to call your attention is the limitations of the treatment of anæsthetic narcosis in so far as posture is concerned. It has become a favorite custom with many to invert partly or completely any patient whose respiration or circulation fails during anæsthesia. It goes without saying that this is only justifiable when heart-failure is shown by marked facial pallor. If the respiration is at fault, we should carefully avoid any inversion, because the presence of still more venous blood about the already exhausted respiratory centre cannot aid it, but only injure it. Further than this, by inversion we may distinctly interfere with the respiratory act by compression of the diaphragm through displacement of the abdominal viscera. This fact is particularly true in persons with large pendulous abdomens, or in persons who have recently suffered or are suffering from tumors of the abdomen. By means of these growths the antero-posterior and lateral diameters of the chest in the neighborhood of the floating ribs are greatly increased, and the diaphragm is stretched and becomes more sail-like. Thus I have seen death follow the removal of a large ovarian tumor forty-eight hours after the operation, because the diaphragm, having no points of resistance on which to contract, because of the collapse of the lower part of the chest, simply rose and fell like a sail of a vessel coming about,—a useless organ, encroaching on the chest cavity during inspiration, and descending in such a way on expiration that little air passed out of the trachea. If any of you will place a rabbit under ether or chloroform, when tied flat on its back, so that its ponderous abdomen encroaches on its comparatively small chest, you will find that respiratory death quickly ensues, whereas in the erect position this does not occur. The pictures which I show you in this connection are taken of a rabbit held in such a way as to emphasize the movement of the abdominal contents in cases where these viscera are large and movable.

Another point of very great importance in

connection with the use of anæsthetics is the position of the diaphragm and its functional activity. I have been able to foresee danger by watching this muscle, when the examination of the ordinary respiratory act as a whole would fail to show any abnormal changes. So much discussion has recently been before the profession as to the functions which first give us danger-signals that this point becomes the more interesting and valuable. It is an invariable rule, under the influence of ether at least, that the first evidence of the full effect of ether is seen in the diaphragm. As soon as the movements of this muscle become abortive or irregular, it is time to stop the anæsthetic. Of course, this only applies to the case which has passed the early stages of struggling, when the struggles may readily interfere with the regular action of all the muscles of respiration. The movement of the diaphragm which forebodes ill is, as I have said, an irregular, to-and-fro, flapping movement, the reverse of the normal; for in the normal the belly-wall protrudes in inspiration and recedes on expiration.

Another point of great importance, not only in the treatment of persons suffering from the over-effects of anæsthetics, but in the case of other accidents, is the use of heat. This was first impressed on me forcibly by some studies made on the dog and on man in 1888, and later by further observations on man. I found that it was possible to lower the bodily temperature of the dog many degrees by prolonged anæsthesia, and that in man a fall amounting to four degrees might occur in comparatively brief operations, even when little or no blood was lost. I had hardly made these observations before I had a striking example of care in scientific study exceeding care in ordinary surgery. Visiting Victor Horsley's laboratory in the Brown Institution, I saw a monkey upon whom a brain experiment was being performed, lying unconscious in a water-bath, and well covered to retain his heat. This, I was told, was practically a necessity for the survival of the monkey and the success of the work. The next day, however, I found that in operating on the human brain no such precaution was taken. The application of heat about the body of a person undergoing an operation is of the greatest importance, and its use after the operation stultifies the operator, who forgets the old adage, "An ounce of prevention is worth a pound of cure." Care should be taken that the heat is not too great, and that artificial heat-stroke is not brought about. The same facts hold good in regard to cases of hemorrhage or shock. I have seen a number of cases of hemorrhage where heat has been the only remedy not employed. As food is used for the production of bodily heat, we are practically providing the patient with food without giving his organism the labor of metabolism. That death is due to cold in many cases is shown by the experiments of Brunton, who has found that animals poisoned by chloral die from doses which, when artificial heat is given them, fail to produce dangerous symptoms.

At the risk of wearying you, I wish to call your attention to the use of strychnine as a remedy for and preventive of surgical shock and anæsthetic collapse, not to speak of its value in opium-poisoning. In these conditions atropine, while very useful, so far as its vaso-motor effects are concerned, does not compare with strychnine either theoretically or practically. To those who habitually employ atropine and morphine injections prior to the use of an anæsthetic, let me recommend the use of strychnine or strychnine and atropine combined. There is one point to be remembered in regard to the use of strychnine in shock or accident, and that is to give it in full doses or leave it alone. Not less than $\frac{1}{20}$ grain should be employed hypodermically every half-hour in an adult, and, if the condition of shock or respiratory and cardiac failure be marked, one dose of as much as $\frac{1}{8}$ grain may be given in this way. Disagreeable effects rarely, if ever, follow, and if they do, will amount to little more than muscular twitching, which can readily be governed by sedatives, for if the drug can stimulate the nervous system sufficiently to cause irritability, it will have pulled the patient out of the "Slough of Despond," and he will be able to stand further treatment should the effect of the strychnine be excessive. Under the conditions spoken of, the man is on the brink of death, and we cannot afford to make haste slowly in dragging him back. A few moments lost and he may be beyond reach, and so far over the edge that human aid cannot draw him back to life.

Another point to which I wish to call your attention is the position of the head, neck, and tongue where artificial respiration is being performed. I show you here the position of the epiglottis in its relation to the glottis in various positions of the head and neck. From these diagrams you will see that the proper way to open the respiratory tract does not consist in drawing the tongue forward at the same time that the jaw is pushed forward

as far as its articulation will allow. Drawing the tongue forward over the teeth does not completely open the glottis; it is necessary that at the same time the jaw be shot forward as far as possible, and that the back of the tongue shall be lifted from the floor of the mouth while it is being drawn forward, it being pulled rather in the direction of the upper than of the lower jaw. The proper position of the head when the body is lying flat on its back is not in full retraction nor in flexion upon the chest, but in extension in a direct line with the body, the entire head, not the chin alone, being then pushed forward. The position of the neck is illustrated by the long-distance runner, who cranes his head and neck forward and upward in order to straighten his air-passages, or in the horse which cuts its wind, and to which the Kimball-Jackson is applied to straighten his air-tubes.

I shall next address you a few words concerning an anæsthetic which has, in my belief, been unjustly banished by most of the profession. An anæsthetic safer than chloroform, and almost, if not quite, as safe as ether. I refer to the bromide of ethyl. Much of the evil influences attributed to it in the past have been due to the use of bromide of ethylene, which many think is the same product, but which is an exceedingly fatal drug, and to the fact that the bromide of ethyl has been wrongly employed. Much of the bromide of ethyl is impure or decomposed. It should be kept in black bottles, tightly sealed, and protected from light and air in every way. The profession are gradually coming to recognize the fact that anæsthetics are to be used, like other drugs, because of distinct indications. In much the same way that the physician decides that digitalis is suited to one case of cardiac disease and strophanthus to another, so should he recognize that one case is suitable for ether, one for chloroform, and one for bromide of ethyl. Experiments recently made by Thornton and Meixell in the pharmacological laboratory of the Jefferson Medical College indicate that pure bromide of ethyl has, even in overwhelming doses, little depressant effect on the heart, and that its dominant effect is on the respiration, which often ceases in the dog two minutes before the heart ceases to beat, the death being due to asphyxia. Indeed, these investigators found it absolutely impossible to produce cardiac death by the use of ethyl bromide by inhalation. The great dominant fact in regard to bromide of ethyl is that it is only to be used for brief operations, not for long ones. In relieving the severity of the pains of labor, Dr. Montgomery, of the Jefferson College, has used it most extensively with the best results, and has also employed the drug in minor operations. The volatility of the drug renders its action both rapid and fleeting, but the great advantage in labor is that it can be inhaled by the patient herself, and as soon as she gets enough to relieve her pain, the hand holding the cone drops from her face, yet the action is so fleeting that the patient, relieved of the acme of pain, is in a moment free from the anæsthetic and ready to obey the commands of the physician, for the drug does not produce the drunkenness of ether or chloroform. When bromide of ethyl is used, it should not be dallied with. From 30 drops to 2 drachms is to be put on the inhaler and pushed. If it is given slowly, it fails to anæsthetize pleasantly, and produces cyanosis, or frequently tetanic muscular contractions in different parts of the body.

In the Harveian Oration delivered by Andrews before the Royal College of Physicians in 1890, he called attention to the fact that, while the general systemic circulation is endowed with vaso-motor nerves to a great extent, the pulmonary circulation has a supply, at least in the lower animals, which does not always act in accord with the larger circulation. By a process of reasoning, which, from the limited facts in his paper, are not well based, but which, in fact, are well founded, he reaches the conclusion that ergot is not a good drug to administer in cases of hemorrhage from the lungs, because it causes, primarily, an increase in the blood-supply to these parts by dilating the pulmonary blood-vessels. I have long been of the opinion that the physician at no time stands as helpless as in the presence of this dangerous and pitiful condition. Many of the methods of treatment advised are either startlingly radical or absolutely infeasible. The use of sprays is usually prevented by the moral squalor which has come over the patient through fever, cough, and the spitting of blood. By far the most common recommendation in the text-books is to give a hypodermic injection of morphine to allay the nervousness of the patient. This recommendation is, I am satisfied, not correct. While it may allay the nervousness, it will likewise cause an increased flow of blood and increase the loss of this fluid. Aside from a mass of experimentation on the lower animals, clinical experience shows most conclusively that morphine is a powerful stimulant of the heart and vaso-motor nerves, and we recog-

nize this power in therapeutics by giving morphine in the dyspnœa and circulatory failure of advanced cardiac disease, where digitalis and other cardiac stimulants fail. If nervous sedatives are needed, we have in chloral a drug whose power over the nervous system is very marked, and at the same time depresses the heart, which, through excitement, is already too active. The bromides can also be employed for this purpose, but the best drug of all is aconite, which is indicated by every symptom present, and which may be much aided in its action by a good cannabis indica. It not only quiets the already excited heart, but still further depresses it, and quiets nervous irritability of the general system. It decreases the amount of blood sent to the lungs, and so lessens the hemorrhage, and it is only contraindicated at one period of the attack,—namely, when the hemorrhage has produced fainting from exsanguination. Under these circumstances it is not necessary to state that still further depression is to be avoided. On the other hand, stimulants are not indicated. We must try to induce the blood to flow at a low pressure in the lung. This is best accomplished by elevating the patient's limbs or trunk, and, if need be, by the application of Esmarch or other bandages to the limbs to exclude the blood from these parts. Here, again, the importance of external heat, already referred to, must not be overlooked.

The narrow escape which we have had from an epidemic of cholera in this country will at least permit me to call your attention to several methods used during the last few years in the treatment of the disease with so much success that they have been and should be employed in the non-infectious choleraic disorders which every practitioner is called upon to treat. This is the more rational since we have now found that all these disturbances of the alimentary canal are due, in great part, to micro organisms, which manufacture poisons in the bowel and prevert its function. The discovery of this fact has led to the founding of our therapy on a firm basis, for many of these germs find a distinctly acid reaction of their surroundings so inhibitory to their existence as to prevent their growth. Thus we have used sulphuric acid for years only for its astringent power, without knowing that it was of value because of its acid reaction, and in France lactic acid is a very favorite remedy in the serous forms of diarrhœa.

As an interesting point in the evolution of medicine, we find the field of usefulness of opium constantly growing smaller, and in no direction has it become more circumscribed than in the treatment of diarrhœal disturbances. This first made itself manifest in the diarrhœas of children, and is pushing its way forward in the same disorders of adults. The reasons for this are not far to seek, for recent advances, clinical and experimental, have proved that the new remedies act directly, whereas opium acts indirectly; and that these remedies have not the objectionable points which militate against opium. Opium may be given for pain, but not for diarrhœa.

Any one who has seen the nausea and depression following the use of full doses of opium in those who are susceptible to it will be strongly impressed with this fact, and in America at least adults of the better classes as well as children of all classes are often so seriously depressed by full doses of opium as to be on the verge of collapse. Not only does the onset of such symptoms seriously complicate like symptoms caused by the disease, but there seems to be no doubt that the use of the drug so seriously perverts the functions of the stomach as to make the entrance of germs comparatively easy by decreasing gastric activity.

If these results are correct, then the generally accepted assertion of Hueppe that the choleraic bacillus finds a strong barrier in the acid secretion of the stomach is not only important, but of such a character as to prohibit the use of opium. Finally, it has recently been pointed out that the stomach excretes opium, even when it is given hypodermically and that the opium nausea can be avoided in the ordinary individual if the stomach be washed out as fast as elimination takes place. The hypodermic method is therefore little better than the mouth administration of the drug.

The drug which has chiefly supplanted opium in the treatment of diarrhœa is salol, a remedy the use of which is based on very rational grounds. According to the interesting studies of Löwenthal, salol seems to be peculiarly antagonistic even to the bacillus of Koch. This investigator added to a 50-gramme alkaline solution of pancreatic juice 10 grammes of salol, and to this mixture 3 cubic centimetres of a good bouillon culture of the bacillus. Examinations in from twenty-four hours to a week showed this to be absolutely sterile. In his experiments on mice, Löwenthal found the drug protective. Hueppe also asserts that the use of salol prevents the development of anuria in true cholora. This is probably accomplished by its action on the bacillus, thereby preventing the diarrhœa and the formation

of the toxine, both of which influence the blood.

Gonzalez, of Salvador, who used salol in the dose of 30 grains at the first and 15 grains at the second dose, lost only three cases out of fifty-three sufferers.

Nicholson, of Patna, India, has also obtained splendid results from salol given in 15-grain doses every three or four hours for a day or two. In all his eighteen cases recovery took place, although eleven of them were in a state of collapse when the salol was first given. Hehir treated eighty-eight cases with corrosive sublimate, with a mortality of 44.7 per cent., and eleven cases with salol with no deaths. In ordinary diarrhœa, as you know, a mixture of salol and chalk relieves the disorder without the use of opium.

The treatment of choleraic diarrhœa in all its forms by enteroclysis or the washing out of the bowel was first used by Cantani within the last decade. The method yielded such good results in his hands that he enthusiastically employed it in a large number of cases, and caused a number of other physicians to use it. The method consists in the slow irrigation of the large and small bowel by way of the rectum by means of a solution urged on by the hydrostatic pressure of a fountain-syringe. The solution contains as its chief constituents tannic acid, which is added in the proportion of from 1 to 5 drachms to the 2 quarts of water, and 1½ ounces of wine of opium.

Carbolic acid is too poisonous, salicylic acid too insoluble, corrosive sublimate too poisonous and too easily decomposed, to be used in this manner.

In some cases Cantani employed a mixture made of infusion of

> Chamomile flowers, 2000 parts;
> Tannic acid, 10 parts;
> Gum arabic, 30 parts;
> Tincture of opium, 2 parts.

Cantani considers that the passage of the ileo-cæcal valve is essential for the success of his methods, and if this is the case, the reporters who have failed to obtain satisfactory results from this treatment have probably failed to do more than irrigate the colon. The importance of irrigating the ileum is great, since it is in this portion of the alimentary canal that the disease is most active. Aside from the very extraordinary results obtained by Cantani, we have those of Lustig, who treated one hundred and seventeen cases of true cholera in this way, with thirty-four deaths, and one hundred and ninety-three cases by other methods (corrosive sublimate enteroclysis), with one hundred and forty-six deaths. Such results as these are most encouraging, and they are supported by those of Bela Angyan, of Buda-Pesth, who in 1886 treated seventy-six cases of choleraic diarrhœa with seventy-six recoveries, eighty five cases of cholerine with eighty-five recoveries, ninety cases in the algid stage of true cholera with fifty-eight recoveries, and two hundred and eleven in a far advanced stage of asphyxia with forty-four recoveries and one hundred and sixty-seven deaths. Nor is this treatment by tannic-acid injections founded upon mere empiricism, for Cantani and others have found that tannic acid, in the strength of one per cent., inhibits the intestinal germs in one and a half hours at 98° F., and one-half per cent. in six hours seriously impairs their vitality. Cantani also asserts that tannic acid neutralizes the toxines formed by these micro-organisms. This treatment therefore contracts the leaking blood-vessels, stops the growth of the bacilli, prevents the absorption of toxines, acidifies the intestine, stimulates the nervous system, warms the body, prevents anuria, and avoids collapse.*

The employment of irrigation of the colon in cases of dysentery is by no means of recent date. It is only, however, within the last few years that this method of treatment has been widely employed or considered. Aside from the ability which we obtain of bringing medicaments in direct contact with diseased mucous membranes, there is no doubt whatever that the mere passage of water at suitable temperatures over the bowel wall is of value, since by this means, we remove mucus and pus, and so dilute the poisons manufactured by the germs of the disease that their further action is largely inhibited. That the irrigation treatment is of value has been shown by Johnston, of Washington, who in a recent paper details exhaustively the advantages accruing from this practice and the harmfulness of opium, particularly by suppository, since this drug, though temporarily causing a decrease in the stools, ultimately increases the trouble by locking in the bowel the very material which we wish removed. As Johnston well points out, our sole object is to keep the colon and

* The details of and results reached by the use of enteroclysis in the summer diarrhœas of children will be published in a paper, which will appear in the THERAPEUTIC GAZETTE, by Dr. Miller, under the direction of the writer's very able assistant in the Jefferson Medical College, Dr. E. Q. Thornton, who is the physician to the Red Bank Sanitarium, an institution designed for the restoration of sick children who come from the slums or poorer districts of Philadelphia during the hot weather. For this reason this part of the address is not included in the printing of this article.

rectum clean. If this can be done without the use of antiseptics in the fluid injected, so much the better. In adults the use of irrigation in dysentery should be carefully carried out by means of an inflow- and outflow-tube, the first being attached to a fountain-syringe. The outflow-tube must be large enough to permit of the liquid leaving the bowel with a readiness equal to that of its inflow, and must be so straight and patulous as to permit of the fluid carrying away with it any flakes of mucus or other foreign matter from the bowel. The method employed in giving the injection, the temperature of the water, and the gentleness of the operation are exceedingly important, and will be considered when I speak of the use of liquid injections in the treatment of intestinal obstruction, of which I shall speak in a few moments. The amount of water employed in irrigation of the bowel in dysentery is not to be measured by quarts, but by results. It should continue to flow until it comes from the outflow-tube perfectly clear, showing that our object, namely, thorough cleansing of the bowel, has been accomplished. The best medicament to be added to the water is boric acid or tannic acid, both of which are harmless and capable of doing much good.

Hypodermoklysis is a method of supplying fluid to the body to replace that lost through excessive purging, as in cholera or in cases of hemorrhage. Further, it may be used to wash out from the body various impurities circulating in the blood or other liquids and to flush out the kidneys. It consists in the introduction of fluid into the subcutaneous tissues of certain qualities of normal saline solution which are rapidly absorbed by the vessels. As is well known, a quantity of liquid equal to four times that of the normal amount may be passed directly into the veins without producing a rise of blood-pressure, and experiment has shown that within fifteen minutes after the fluid flows into the subcutaneous tissues an increased flow from the kidneys takes place. It is not safe to infuse a greater quantity of liquid than one drachm to each pound of body-weight in each fifteen minutes, as, if this amount is exceeded, the accumulation of the liquid in the system is so great that the tissues become bathed and finally drowned because the kidneys cannot excrete the liquid fast enough. In the best article on this subject yet published in this country, Hildebrand, of San Francisco, carefully goes over the ground, and indicates the limits to which the method may be carried, and shows that if the proportions already named be preserved, the operation of hypodermoklysis of normal saline solution may be prolonged indefinitely, and as the process goes on the urine becomes paler and is lowered in specific gravity until it is practically identical with the flowing stream. To carry out the operation the sterilized liquid to be infused—namely, 7 parts of sodium chloride to 1000 parts of water (3½ grains to the ounce)—is placed in a glass jar which is absolutely aseptic, and to which the air only gains access by means of a glass tube filled with sterilized cotton. From the lower part of the vessel leads a tube to which is attached a trocar also rendered absolutely sterile. The skin over the place where the liquid is to enter is to be rendered absolutely sterile, and the trocar is then inserted into the subcutaneous tissues of the thighs, or preferably of the abdomen, and liquid allowed to flow at the rate named, the pressure being obtained by raising the container two or three feet above the belly wall. As the liquid enters, a swelling appears in the subcutaneous tissues which soon disappears after the infusion ceases, and can be much aided in the absorption by the use of massage.

When hypodermoklysis is employed after hemorrhage the results are often extraordinary, and Cantani, who has used the method to overcome the drying of the tissues in cholera, praises it most highly, as does also his critic, Oser. The cyanosis decreases rapidly, the pulse improves wonderfully, and the respirations are no longer difficult. Sahli, of Berne, has used hypodermoklysis with very good results in the treatment of uræmia, and he thinks that not only are the poisons washed out of the system by this method, but in addition that the dilution of the poisons prevents them from acting so forcibly. In septicæmia, diabetic coma, and similar states, this method of treatment should be employed and results carefully recorded and reported.

The question as to what is the best method of treating a case of intestinal obstruction, by other than operative means, is one which is of interest to the physician as well as the surgeon. Such cases generally come into the hands of the general practitioner first, and it is for him to decide, as a rule, whether the surgeon shall be called in consultation. Measures devoted to the relief of the patient, without the use of the knife, are first to be tried. No one who has studied this subject can doubt that enemata are the best form of treatment which we can apply. Used properly, there is little danger of their doing harm, and much chance of their accomplishing good. I am not one of those who place

much confidence in the reports of cases of volvulus overcome by this means. The true indication for rectal injections is intussusception, or obstruction due to impacted fæces. A very important point to be decided in connection with this subject is the amount of pressure which can be used in the stream of water which is employed, the length of time during which the injection may be given, and, finally, the temperature and character of the fluid injected. While it is true that most of us have a general idea of the correct thing to do under these circumstances, experience shows that, when the case stares one in the face, that the minor points connected with the treatment are not to be ignored. As is well known, the great majority of cases of intussusception take place at the ileocæcal valve, and if not here, in the sigmoid flexure. Pressure by injection is, therefore, readily brought to bear on the area involved.

Although it may strike you as being self-evident, a moment's recollection will show you that rectal injections are generally performed not only with force but with rapidity, but this is wrong, as clinical experience and my experiments have proved. By the use of a fountain-syringe attached to a mercurial manometer the number of pounds pressure that it is permissible to use was easily estimated. It has been claimed that certain pressures will cause rupture of the peritoneal coat of the intestine, but we failed in the dog to produce this lesion by any pressure we could employ, since before this occurred the liquid passed through the stomach and mouth. To employ a pressure exceeding eight pounds is, however, distinctly dangerous, not because the intestinal wall in health will not stand this, as a rule, but because it is near the injury line, and if any disease or softening of the bowel exist, it is almost certain to cause rupture. A pressure of from two to five pounds is, as a rule, as much as may be employed, and this pressure should be obtained by degrees, starting the injection at such a point of pressure that it amounts to hardly more than a trickle, and increasing the pressure as the antagonism of the bowel is overcome. Finally, when the bowel is fully distended up to the point of obstruction, the pressure on the no longer moving column of water may be increased, if necessary, to six or eight pounds by raising the bag of water. In infants, in whom invagination so often occurs, a pressure greater than two pounds is dangerous, and it is of vital importance that the pressure be employed properly, otherwise it will do more harm than good in several ways. As a rule, in our anxiety to give the patient relief at once, we are inclined to use too much force and too large a bulk of water, and think that active force, if I may use such a term, is to be resorted to. Those of you who have seen these cases have learned by experience the harmfulness of such measures, and have also learned how great is the expulsive power of the bowel when it is excited to contraction. If this power be brought into activity, it will be almost impossible to inject fluid into the rectum, and, worse than all, the muscular fibres of the intussuscipiens take a still tighter grasp on the intussusceptum.

In order to determine the exact amount of pressure permissible in such cases, Dr. Martin and myself carried out a series of experiments, and found from the very first that the force exercised is a comparatively unimportant factor compared with speed,—that is to say, an injection of two quarts of water, made very slowly, was less apt to cause intestinal opposition than one pint rapidly sent into the gut. This is, perhaps, the most important point to be remembered in our treatment. At the risk of saying that which is trite, let me call your attention to the dangerous practice of using a Davidson or any other kind of artificial force syringe in the treatment of this class of cases. We know of three unreported cases of rupture of the bowel and death from the employment of the Davidson syringe for this purpose, because the amount of force used was indeterminable, and because it was injected by a jerking instead of a constant flow. In the "Medico-Chirurgical Transactions," fifty-ninth volume, there are many of these accidents recorded. The amount of fluid injected should be large, and if it is impossible to get a large amount into the bowel, it is probably because the inflow has been so rapid as to excite intestinal opposition. If, by a slow trickle of water into the bowel, gradually increasing the pressure, we are unable to give relief in forty-five minutes, it is necessary either to give this treatment up as useless, or else allow the liquid to flow away, and resort to the measure again in some hours. Practical experience has shown that the second or third injections sometimes succeed, probably because they are more skilfully given, and the first has prepared the way for the others, but it is to be remembered that the chances are best with the first injection, if it is properly given. Frequently repeated small injections are absolutely unjustifiable.

Finally, I cannot leave this subject without saying a word concerning the temperature of the injected liquid and its constitution. An injection of this kind goes into the very heat citadels of the body, and if too cold, as it often is, produces dangerous chilling of organs which are ordinarily especially protected from cold by the omental apron and intestines. By repeated experiment, we found that water at 65° F. lowered the bodily heat three degrees in thirty minutes. The use of colder water than this (52° F.) resulted in death in twelve hours, and the post-mortem showed intense congestion of the colon, which contained bloody mucus.

The use of water of too high a temperature is also dangerous, lest it produce heat-stroke. Of course, no one would use water hot enough to produce local harm, yet it is necessary to have just enough heat and no more. In our first experiment we proved that the use of water at 115° F. caused in twenty-five minutes a rise of bodily temperature in the axilla of nearly five degrees, and developed marked symptoms of heat dyspnœa. The temperature which it is right to employ we found to be 101° to 103° F. as it entered the bowel, or even as high as 104° F. in the water-bag, if a long tube was used, as under these circumstances the water is rapidly cooled. An interesting result of these experiments as to heat is that, when cold water was used, it took four times as long to make the injection as when moderately warm water was employed.

If very large injections are used, a normal saline solution of 7 per 1000 should be employed to avoid the abstraction of vital salts from the intestinal wall, with consequent passage of water into the tissues, making them boggy, according to the law of osmosis.

In regard to the effect of distention of the bowel by injection on the circulation and respiration, we found practically none, but the passage of large amounts of warmed fluid into the abdominal cavity causes death rapidly.

ON THE DECOMPOSITION OF SALOL.

At the Société de Biologie of Paris, at the meeting on April 9, GLEY reported the results which he had reached in the decomposition of salol by the pancreatic juice. It will be remembered that Nencki affirmed that salol does not exercise an antiseptic action in the alimentary canal until it is decomposed by pancreatic juice, so that salicylic acid and phenol are liberated. Gley has found, on the other hand, after extirpation of the pancreas of two dogs, the extirpation being verified by an autopsy, that the urine soon contained salicylic acid, though there was not any pancreatic juice in the intestine.

He, therefore, concludes that other liquids must be active in addition to the secretion of the pancreas.—*Revue de Thérapeutique Médico-Chirurgicale*, May 1, 1892.

PRESCRIPTION FOR LARYNGEAL PHTHISIS.

L'Union Médicale for April 9, 1892, gives the following prescription:

℞ Iodoform, gr. lxxv;
Powdered phosphate of lime, ʒiiss;
Powdered boric acid, ʒi;
Menthol, gr. v. M.

Sig.—Morning and night insufflate a sufficient quantity of this powder into the larynx.

For the relief of difficulty in swallowing, or the irritation which may be present, it is well to use a swab wet with a solution of cocaine.

PRESCRIPTION FOR INFANTILE DIARRHŒA.

According to *L'Union Médicale*, GRANCHER recommends the following prescription in the treatment of the summer complaint of children:

℞ Lactic acid, gr. xxx;
Distilled water,
Syrup, of each, ʒiss. M.

Sig.—A small teaspoonful of this is to be given every five or ten minutes, or half-hour, according to the gravity of the case.

Injections are to be given of hot water. The stomach is to be washed out with Vichy water, and, for the purpose of combating the collapse, the hot mustard bath should be administered, the child remaining in it six minutes at the maximum. Subcutaneous injections of 8 to 10 minims of ether may be given. In other instances it will be well to administer every fifteen minutes a teaspoonful of ordinary hot coffee, or the following prescription:

℞ Citrate of caffeine, gr. iv;
Rum, ʒv;
Malaga wine, ʒi;
Syrup, ʒii. M.

Sig.—A small teaspoonful every fifteen minutes.

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EDITED BY
H. A. HARE, M.D.,
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EDWARD MARTIN, M.D.,
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Leading Articles.

THE TREATMENT OF GUNSHOT WOUNDS INFLICTED BY THE MODERN RIFLE.

IT is evident that the modern rifle will in the next great war produce changes not only in the prognosis and treatment of wounds but also in the proper arrangement and utilization of the sanitary corps of an army. The new rifle differs from the old from the fact that it is a rapid-firing gun; that the cartridges are loaded with an explosive of very much greater power than gunpowder; that the calibre of the bullet is much smaller than has heretofore been used for military service, the projectile at the same time being made considerably longer, so that it may more readily overcome the resistance of the air; that the rifling of the barrel is more distinctly spiral, thus giving to the bullet more rapid rotation on its long axis. As a result of these factors muzzle velocity is greater, the range greater, the penetrating power greater than in the case of any similar arm heretofore used.

Within the last forty years the tendency has been to steadily diminish the diameter and weight of the missile employed in muskets. Starting with a ball of .72 of an inch in diameter, weighing about eight hundred grains, the bullet has been reduced, until in our own army, and until very recently in the armies of Europe, it was .44 of an inch in diameter and weighed four hundred grains. Within the last few years the armies of Europe, notably those of Germany, France, and Austria, have still further reduced the diameter of the ball to .30 or .32 of an inch, and have reduced the weight to about two hundred and forty grains. This ball is about one and one-fourth inches long. It is projected by a high explosive with a muzzle velocity of from four hundred and fifty to six hundred and fifty yards a second, has impressed upon it by the rifling of the gun a very rapid rotary motion, and carries about two and a half miles. Since lead would not take the rotation required by the pronounced rifling of the gun-barrel, the bullets are steel or copper cased. The weapon is accurate up to a long distance without any alteration of sights. This is on account of the great velocity with which the ball is projected.

Bruns has lately experimented with the penetrating power of this weapon. The steel-cased bullet passes through soft parts and flat bones without changing shape in the least. Sometimes in shots which struck the long bones a portion of the casing, or even the entire covering, was torn off. This was exceptional.

At a distance of between thirteen hundred and fourteen hundred yards the bullet passes through and through a man's body. Bullets fired at from nine hundred to thirteen hundred and fifty yards passed through two to three bodies; from four hundred and fifty to nine hundred yards, through three to four bodies; and at a little over one hundred yards, four to five bodies.

Wounds inflicted at a distance under four hundred and fifty yards showed some of the explosive action,—that is, there was shattering and contusion wide of the direct line of the ball, yet such shattering action was not nearly so severe as was produced by the old leaden bullet. The canal formed by the missile corresponded very closely to the calibre of the latter, the exit wound being very little larger than that of the wound of entrance. Shots perforating the lungs and the empty bowels showed little of this explosive action.

When the liver, spleen, or kidneys were wounded, however, there was often marked and wide-spread laceration and contusion. At a distance of between four hundred and fifty and nine hundred yards the explosive action was only noted in wounds of the skull. When the long bones were struck there was some comminution, but the splinters were large and were held together by periosteum.

Wounds of the large bones and those about the joints were attended by very little splintering. At a distance of from nine hundred to thirteen hundred and fifty yards small smooth-edged wounds were produced, the wound of entrance forming a small hole somewhat less in diameter than that of the bullet, the wound of exit often appearing as a scarcely perceptible slit.

At a range between thirteen hundred and fifty and two thousand two hundred yards injuries of the bone are more liable to become splintering in character. The glancing shots often produce large lacerations from alteration in the shape of the ball.

It seems quite certain from these investigations and others which in general results closely correspond to them, notably those of Delorme, Habart, and Chauvel, that though the number of wounded will be much larger than in former wars, owing to increased range, increased rapidity of firing, and increased penetrating power, excepting when such wounds strike vital organs and penetrate the cavities of the body, the prognosis will be much better than in the case of wounds in similar positions inflicted by the old bullets. Healing should be rapid, and not attended by suppuration.

It is probable that the new bullet will be followed by more deaths from primary hemorrhage than was the case with the old lead missile. The latter was often altered in shape when it struck the body, and produced a lacerated wound much larger, of course, than that produced by the modern bullet, but still, like all lacerated wounds, accompanied by little primary bleeding. Any vessel lying in the track of the modern ball will certainly be injured, and such injury will be more of the nature of a punctured or incised wound than of a laceration. From the small size of the ball-track bleeding is more liable to take place into the cellular tissue or to be poured out into one of the cavities of the body than to appear externally.

From the surgeon's stand-point, a proper understanding of the action of the new weapon is of considerable importance in modifying the treatment appropriate to gunshot wounds.

In the first place, the modern missiles pass through and through, rarely remaining in the body, hence the necessity for removing them will become the rare exception.

On account of their high velocity, these missiles pass in a straight line between the wound of entrance and the wound of exit, deflection of the ball being most exceptional. Therefore the surgeon will be enabled to estimate with some degree of accuracy the tissues and organs which have been wounded. Excepting at very long range, the splintering of bones is comparatively slight. Therefore the question of resection or amputation from bone injury alone will come up much less frequently than was the case when the large leaden bullet was used. Wounds of the joints similarly will rarely require resection. Indeed, in perhaps the great majority of cases the surgeon's attention will be limited to cleansing the external wound, and applying an absorbing, antiseptic compress to it, this being allowed to remain in place until complete convalescence. Where bones are broken or joints are perforated, to this dressing must be added appropriate splints. Penetrating wound of the abdominal cavity will almost certainly be accompanied by visceral lesions, and cœliotomy will probably be indicated more frequently than in former times, either for the control of hemorrhage or for the repair of lacerations of the hollow viscera. Ligation for primary hemorrhage will probably be required more frequently than heretofore. It has been noted that wounds of the skull show a special tendency to extensive comminution. Such wounds when not fatal will probably demand trephining and drainage. Flesh wounds may be expected to heal with great rapidity, and indeed the prognosis of nearly all injuries not fatal in a short time may be looked upon as good. This, however, is not only due to a change in the missile employed, but also to the advent of antisepsis, which in itself practically does away with the secondary hemorrhage and the septic troubles, from which in our own war, for instance, so many perished.

Though there is a general belief to the contrary, it has been shown experimentally that the balls fired by the modern rifle are not necessarily sterile at the time of impact. No pathogenic germs have been found, however, and for practical purposes the bullet wound may be considered clean, unless some portions of the clothing have been carried in.

In so far as the wounds inflicted by the new rifle are concerned, the field-surgeon's armamentarium will probably be made up of tournequets, antiseptic dressings and solutions, splints, bandages, and diffusible stimulants, cases re-

quiring ligation, trephining, or cœliotomy being transported to the field hospital, where the probe and bullet extractors of former times will be required only exceptionally.

The placing of medical officers, the location of field hospitals, the transportation of the wounded, all the regulations concerning the functions of the medical corps of an army while the latter is in action, will probably be modified by the greater accuracy and carrying power of the new weapon. Though it has not yet been adopted in the United States, there is little doubt that this country will shortly give official sanction to weapons and explosives which project smaller and lighter bullets with increased velocity and greater accuracy.

THE SURGICAL USES OF ICHTHYOL.

ICHTHYOL, a distillation product of bituminous material, containing large quantities of sulphur, is a drug which has been steadily and rapidly gaining ground on its merits, as shown in clinical practice.

In Germany it is used in enormous quantities, and is prepared in the form of pastes, plasters, salves, and solutions. It is mainly employed by the dermatologists, yet in certain cases the general surgeon finds it useful.

In this country, excepting by the dermatologists, its use is exceedingly limited.

The sulphichthyolate of ammonium is the best preparation to employ. It is a thick, dark-brown, greasy, bituminous-smelling solution, soluble in alcohol and ether, in water, and in all the oils and fats, and is not readily decomposed. It seems to be devoid of toxic effects, at least when it is applied only to the surface, and even by the stomach it can be given in large quantities without evil results. It has some antiseptic power, but this is by no means pronounced. Its special value lies in the constricting action it exercises upon the vascular system. This is, perhaps, nowhere better shown than in erysipelas. In this disease the drug can be used either as a thirty to fifty per cent. ointment, with lanolin and lard, or perhaps better in the form of a thirty per cent. solution in water. It is painted two or three times daily over the inflamed area, especially about its border. When used before the disease has made great headway these applications are almost specific. Fever promptly subsides, the disease ceases to spread, and resolution takes place in a few days. This is accomplished not so much by the specific action upon the streptococcus as by the vaso-motor action by which the blood-vessels are constringed, and thus the micro-organisms are deprived of their nutriment and cease to multiply rapidly.

The general erythematous swelling so often observed about septic wounds, acute angioleucitis, acute œdema accompanying inflamed ulcers, all surgical conditions associated with dilatation of the superficial blood vessels and the consequence of such dilatation, yield more readily to the applications of ichthyol than perhaps to any other local medication. Where the skin is exceedingly sensitive, solutions of about ten per cent. (or ointments) should be employed, gradually increasing the strength until it reaches forty or fifty per cent. When these stronger preparations are used, the whole surface to which they are applied should be washed with mild soap and warm water once daily, and should be carefully dried before another application is made.

Hemorrhoidal conditions, particularly when associated with subacute inflammation, are said to be peculiarly benefited by ichthyol administered both internally and locally. The dose for internal administration is from 3 to 5 grains three to five times a day. Thus used it is supposed to benefit hemorrhoids by its favorable effect upon the portal circulation.

Acne and acne rosacea are perhaps the two skin-diseases upon which the reputation of ichthyol as a specific is mainly founded. In such cases the drug is used both internally and externally.

In furunculosis local applications of a fifty per cent. ointment made up with lanolin or lard give better results than any other single treatment. If this remedy is applied in the forming stages of a boil, the latter is frequently aborted.

In adenitis, in cellulitis, in all the deeper forms of inflammation, local applications of ichthyol are not of the slightest service. The drug has been extravagantly lauded in the treatment of gonorrhœal rheumatism. Here again its use is as disappointing as has been the use of other medicaments. In articular rheumatism its application is sometimes followed by prompt subsidence of pain.

THE TREATMENT OF INTESTINAL CATARRH.

THERE are many cases which present themselves to the physician for treatment in which a study of the history or examination of the passages will show that many, if not all, of the symptoms presented are dependent

upon a condition of catarrh of the small or large bowel. These symptoms in some instances point to the absorption of toxic substances formed through the action of bacteria and the processes of fermentation. In other instances the condition is manifested by laxity of the bowels, either the single movement of the day being somewhat loose, or there being a number of movements, some of them loose and some natural in character.

Under these circumstances, scattered through the movement will be found flakes of mucus, either adherent to the fæcal matter or freely separated from it. Sometimes after a movement which appears natural a second movement will follow, consisting almost entirely of mucus, with sufficient fæcal or biliary matters to color it. These last conditions, however, generally occur in persons suffering from catarrh of the colon, rather than of the small intestine. In children, as is well known, one of the most obstinate gastro-intestinal conditions we have to treat is catarrh of the alimentary canal. Frequently the parents will inform the physician that the child suffers considerable griping pain, either at frequent intervals during the day or just prior to having a movement, and that when the movement takes place there is a large amount of mucus present in it. Frequently in children this is accompanied by what is known as spinach stools, greenish flakes being scattered through the mucus.

Under the circumstances which we have named, relief seldom results from the use of full doses of such mild alkalies and powerful constipators as bismuth and opium. While they may produce temporary improvement, the ultimate effect is not satisfactory, and the recurrence of the disease nearly always takes place. In adults, in whom the condition which we have mentioned exists either in the colon or small intestine, a prescription containing creosote as its principal ingredient frequently proves of very considerable value. Thus the following formula may be employed:

Creosote, f℥i;
Compound tincture of gentian, f℥iss;
Rectified spirit of wine, f℥iss;
Sherry wine, Oi.

A tablespoonful of this mixture, in a wineglassful of water, may be taken three times a day after meals.

In other instances it is better for the patient to be placed upon alkalies, combined with a simple bitter tonic, such as the following:

Bicarbonate of sodium, ℥i;
Compound infusion of gentian, f℥iv.

A dessertspoonful three times a day after eating.

In still other instances, in which there seems to be a considerable quantity of tenacious mucus in the bowel, it will be found necessary to employ a more powerful drug than the bicarbonate of sodium, and under these circumstances resort may be had to the chloride of ammonium, combined with gentian, in place of the bicarbonate of sodium. The stimulating influence of the chloride of ammonium upon the mucous membrane is closely allied to that which produces the good effects in cases of subacute bronchitis, where we desire to loosen the mucus and get rid of it.

There is another series of cases which differ from those which we have already named, in that they do not present any condition of laxity of the bowels, but, on the other hand, are troubled with constipation.

Their symptoms, however, are very much as those already described: flatulence is even more frequent, and griping commonly occurs, either throughout the day or prior to the movement of the bowels. It will be found that in these passages mucus is present in considerable quantity, generally in flakes, which can be separated by washing, or are readily discerned by the eye. The stools under these circumstances may be either light or dark in color, but they are rarely of a normal appearance. Frequently they are pasty.

Under these circumstances one of the best prescriptions which can be given is a capsule made up as follows:

Resin of podophyllin, gr. ¼;
Extract of leptandra,
Extract of euonymus,
Extract of chiretta, of each, gr. xl;
Creosote, ♏v.

This is to be made into twenty capsules, one capsule to be taken three times a day after meals.

It will be noticed that in all the treatment so far recommended we have particularly omitted mention of drugs which are devoted to stopping bowel movement, and we think it is an invariable rule in the treatment of these conditions of the alimentary canal to avoid the use of any remedies which will tend towards the confinement of mucus, which is already secreted in the alimentary canal. It is our duty to remove the mucus which has already formed and to prevent the formation of more mucus. Generally the mucus already formed is readily removed by the peristalsis which is present; and if the formation of an excess of this secretion be prevented by the proper administration of drugs, the condition of the patient is rapidly ameliorated.

For the anæmia, which is frequently associated with these conditions, we believe that the employment of arsenic or minute doses of corrosive sublimate is preferable to the use of any one of the iron salts.

It is an important point for the physician to order the avoidance of starchy foods. This must be insisted upon absolutely in the case of children, and both adults and children must be especially warned against the use of potatoes or similar starches difficult of digestion.

Zweiback, or bread which has been toasted twice in an oven, should be the form in which starch is taken, if at all. This may be made more agreeable by taking it in the form of milk-toast, or by breaking up the toast in oyster-broth, or broth made from either beef, mutton, or chicken. In some cases the physician will find that it is useful to permit small quantities of well-boiled rice in the broth or to give rice well mixed with milk, the latter being predigested, by one of the well-known peptonizing processes, in particularly severe cases.

A factor to which too little attention is given in these cases is the exposure of the abdominal walls to cold. It is one of the faults of modern dress that the waist is more exposed to cold than any other portions of the body, because it is in this region that the upper and lower garments are usually joined together. In the children it is an exceedingly common thing to find, when disappointment follows active medicinal treatment, that the abdomen of the child is poorly clad, or entirely uncovered. In adults it is absolutely necessary in some cases to insist upon the wearing of a knit or flannel band about the waist. This band should extend over the hips, and to the floating ribs, or a little higher. It should be elastic and close fitting, so as not to chafe the skin or produce discomfort.

Where the secretion of mucus is excessive, and is in such amount that it coats the food so that masses of food are passed in intimate admixture, it is well for the physician to administer castor oil before resorting to other treatment, or in other cases still to give the following prescription:

℞ Bicarbonate of sodium, ʒi;
Syrup of rhubarb, ℥iv. M.

Sig.—A tablespoonful to 2 tablespoonfuls to an adult, not to be repeated more than once. In a child, from a teaspoonful to 2 teaspoonfuls of this mixture may be given.

The rhubarb not only moves the bowels and so rids them of mucus, but exerts a peculiar tonic and astringent effect upon the mucous membrane of the intestine, which in many cases is most salutary.

CLOSURE OF THE LACHRYMAL PUNCTA IN DACRYOCYSTITIS AS A BARRIER AGAINST INFECTION OF THE WOUNDED EYEBALL.

THE lachrymal sac may be looked upon as a reservoir for the fluid secreted by the conjunctiva, and when this fluid becomes more or less loaded with micro-organisms, or when the character of the lachrymal secretion changes under pathological conditions, because its egress is stopped by a stricture in the duct, the sac becomes stuffed with micrococci, and a potent source of infection is at hand. In dacryocystitis the streptococcus pyogenes is present in large numbers, and inoculation with this material, as Widmark has shown, will cause a phlegmonous inflammation. If the cornea is abraded, or if a solution of continuity in this membrane is necessitated by an operation, the presence of these pathogenic micro-organisms in the lachrymal secretion is a serious complication. They may convert a simple abrasion into a sloughing ulcer or an aggravated hypopyon keratitis; they may prevent the healing of an ordinary keratitis; and, finally, they may inoculate an operative wound and defeat the object of the operation. The knowledge of these facts has made the rule imperative that no operation shall be performed requiring an incision into the corneal structure, for example, in cataract extraction, if there is an unsound condition of the lachrymal sac or duct. Even in the absence of evident disease of the lachrymo-nasal passages, it will sometimes be found, if the canaliculus is dilated and the point of an Anel syringe introduced, that there is stoppage in the passage lower down. In many of the cases there may be no special symptom which indicates the complication, because very often the canal is simply narrowed, as is indicated by the fact that a little of the fluid trickles through the nose, while the greatest quantity of it is regurgitated through the upper canaliculus.

Haab (*Deutschmann's Beiträge zur Augenheilkunde*, 3. Heft, 1891; abstract in the *Therapeutic Gazette*, January, 1892) is so convinced of the importance of detailed attention to the tear-passages before operating for cataract, that if there is the slightest suspicion on the day before the operation that they are not in a normal condition, he closes

both the upper and the lower canaliculus by introducing for five millimetres into each canal the wire of a galvano-cautery, connects the battery, and produces a severe cauterization of the mucous membrane. Since he has done this, he has had little dread of this complication and no reason to regret his procedure. He finds that eyes treated in this way do not secrete tears freely, and as a rule remain free from inflammation, exactly as after extirpation of the lachrymal sac. He has never seen this procedure produce dacryocystitis or other disturbance, even if it caused a permanent closure of the canal. The great dread of inoculating a corneal wound with a pathological secretion from the lachrymal passages has made operators so unwilling to undertake cataract extraction, if there is the least danger of infection from this source, that Haab's somewhat rigorous procedure, in spite of his assurance that it is a perfect protection, will probably not find many advocates, although it might be a perfectly proper method in those cases in which, even after the most vigorous antiseptic irrigation of the tract and the securing of complete patency of the duct, a suspicious secretion still remained.

The menace from this source of infection, however, is not alone towards an operative wound, but also, as has been above indicated, towards corneal disease or injury, when it threatens to turn a simple abrasion into a dangerous ulcer, or prevents the healing of an ulcer already formed. The closure of the lachrymal puncta, when there is dacryocystitis under the last condition, has been the subject of study by Dr. G. A. Aschman, of Wheeling, West Virginia, who contributes his experience in a paper read before the forty-ninth annual meeting of the American Medical Association in June of the present year, and published in the *Journal of the American Medical Association*, September 10, 1892. He points out the striking fact that from twenty to thirty-two per cent. of the cases of hypopyon keratitis are complicated with dacryocystitis, and believes that while the most careful treatment may be directed towards the ulcerated cornea, sufficient attention is not paid to the source of infection, namely, the lachrymal apparatus, and that all efforts may be futile as long as there is a chance of the renewed entrance of infectious material. He is not unmindful of the fact that surgeons endeavor to remove the purulent secretion from an inflamed lachrymal sac which complicates an ulcerated condition of the cornea, but feels that time may be lost in following this routine treatment, judicious as it is, which is necessary to save the eye. Moreover, he feels the importance of excluding the entire lachrymo-nasal apparatus from participation in the process, at least long enough to secure cicatrization of the ulcer. Pursuing this line of reasoning, he has deemed it wise in a certain number of cases, after disinfecting all the implicated parts in the best possible manner, to temporarily close the lachrymal puncta.

Dr. Aschman's paper is illustrated with the history of three cases. In one case, a man aged 63 had an extensive hypopyon keratitis complicated with a muco purulent discharge from the lachrymal sac. The usual treatment was instituted, the lachrymal passages were carefully treated, and Saemisch's operation was performed. In spite of the antiseptic precautions, the corneal wound did not close, and after a day or two Dr. Aschman found a yellowish infiltration of its edges and pus beginning again to accumulate in the anterior chamber. It then occurred to him to reach the source of the trouble, or, rather, to blockade the source of the trouble by closing the puncta with an electro-cautery. After injecting cocaine, he pushed a fine wire about one-eighth of an inch through the puncta, and, closing the current, brought the point to a red heat, which after a few seconds was slowly withdrawn. His expectations were realized, as the resulting cicatrization of the mucous membrane brought about a firm adhesion of the walls of the canaliculus. Repair in the ulcer began at once, and a week later the corneal wound was sufficiently closed to permit the reopening of the lower punctum and the evacuation of the muco-pus which had accumulated in the sac. In two other cases, one of hypopyon keratitis, and the other of an infiltrated ulcer of the centre of the cornea, without, however, any hypopyon, but both complicated with dacryocystitis, the same procedure was enacted with the same happy results.

Inasmuch as no permanent disability resulted from this slight operation, and as the closed canal can be reopened and the subsequent treatment necessary to secure healing of the inflamed mucous membrane of the lachrymo-nasal duct can be carried out at a time when corneal cicatrization has reached a stage precluding the danger of infection from this source, this ingenious suggestion of Dr. Aschman, based upon an experience of three typical cases, is worthy of attention. No doubt in many instances the ordinary medication to the lachrymo-nasal duct would be sufficient without closure of the punctum, but it is

readily conceivable that much time might be gained by temporarily blocking the puncta in the way which has been described. Certainly this has enabled Haab, with the aid of other proper antiseptic precautions, to remove a number of cataracts in spite of the presence of dacryostenosis, and there is no reason to doubt its occasional efficiency in suitable cases of wounded cornea from other causes, or its probable aid in hastening the cicatrization of an infective ulcer, by temporarily preventing access to the inflammatory area of a fluid which experimentation and clinical experience has demonstrated to be highly detrimental to the process of repair.

THE VALUE OF LITHIA WATERS.

IT is one of the curious developments of modern medicine that remedies largely used by practitioners for years are suddenly shown to be lacking in the powers generally attributed to them. For years the profession has used lithia water in various diseases with the idea that the results obtained were due to the comparatively small quantity of lithia present in solution. Those physicians who examined the subject closely speedily concluded that the greater part of the benefit derived by patients from so-called lithia waters depended rather on the large amount of pure water ingested than upon the lithia contained in it. In other words, the pure water practically flushed the body of impurities. These conclusions were still further supported by the discovery on analysis that one of the widely-advertised lithia waters, indorsed by a large number of misguided persons, was only a pure water, with practically not a trace of lithia in it. Still more recently, Haig has told us that while lithia speedily combines with uric acid in a test-tube, in the body it has a greater affinity for the acid sodium phosphate in the blood, and combining with this leaves the uric acid untouched. Lithia waters should be used not for their lithia but for their purity, and the results obtained placed to the credit of the flushing of the system, not to the lithia. A recent advertisement by one of the lithia water companies states that one of the editors of the THERAPEUTIC GAZETTE strongly recommends lithia water, and not only this, but states that their particular brand is the best. The truth is that he has never employed their commodity, and has only recommended another brand of lithia water when *no other* pure water is obtainable.

Reports on Therapeutic Progress.

THE TREATMENT OF EPILEPSY BY CUTTING THE CERVICAL SYMPATHETIC.

JACKSCH, of Neunkirchen, in Austria, has performed neurotomy on the great sympathetic, in association with ligature of the two vertebral arteries, which had failed to yield to ordinary medicinal treatment, and which was supposed to be due to irritation of the gastro-intestinal branches of the sympathetic nerve. In these two cases the aura consisted of an intense constrictive pain in the epigastric region, accompanied by vomiting, and it was always noticed that with each access of an epileptic paroxysm there was a condition of catarrh of the bowels.

Section of the sympathetic was performed at the right inferior cervical ganglion. After the operation the epileptic paroxysms completely disappeared, and the cure has been maintained during a period of a year in both cases.—*Journal de Médecine de Paris*, May 29, 1892.

THE TREATMENT OF TYPHOID FEVER BY CHLOROFORM.

WERNER recommends the employment of chloroform in the treatment of typhoid fever, because he has obtained good results in no less than one hundred and seventy cases. During the period of ascendency he administered chloroform in a one per cent. solution, using two dessertspoonfuls every one or two hours night and day. During the period of descendency, chloroform in the same percentage was given in the dose of a dessertspoonful every two or three hours. Vomiting occasionally comes on, but is exceptional, and icterus was seen in only four cases. The medicine is, however, well tolerated by patients, and no disagreeable secondary phenomena usually follow its use.

The advantages which he claims for it are the decrease of the mortality, diminution in the severity of the diarrhœa, and in the fact that meteorism becomes less and less.—*Journal de Médecine de Paris*, May 29, 1892.

ON THE TREATMENT OF INFECTIOUS BRONCHO-PNEUMONIA ORIGINATING IN THE ALIMENTARY CANAL.

In the case of broncho-pneumonia of intestinal origin, SEVESTRE quoted the following observation of Renard in regard to it:

The infant is attacked with a diarrhœa, which is exceedingly fetid, jaundice asserts itself, the belly is swollen, the face is pale, the pupils are dilated, and the liver is tumefied. With the onset of the fever, pulmonary phenomena manifest themselves, which resemble closely broncho-pneumonia. The progress of the disease is exceedingly irregular, and its intensity is very variable. In some instances the symptoms are so severe that death comes on in the course of a few days, and generally under these circumstances death is due to asphyxia. More commonly, however, the fatal result is reached in a condition of collapse. The prognosis is exceedingly grave if the child is less than two years of age. In some cases the disease is complicated by tuberculosis. Those who have seen this condition most frequently insist most strenuously upon energetic intestinal antisepsis from the moment the child is first seen. Calomel is given for its antiseptic action upon the intestinal canal, and also with the hope of decreasing the congestive process in the lung.

Sevestre employs 1 grain of calomel in infants less than six months, and increases this dose up to one grain for each six months up to the age of two years. After this he augments it an equal quantity for each additional year. For the combating of the pulmonary phenomena he applies dry or wet cups, according to the intensity of the symptoms, or, in other instances, mustard-plasters are used. If there is marked dyspnœa, he recommends the use of two or three injections of ether or of caffeine each day. He also prescribes general tonic and supportive treatment. The algid tendencies are opposed by dry frictions, or by the use of alcohol rubbings, and enveloping the patient in woollen garments.

Sevestre and Renard state that the pathogenic agent under these circumstances is the bacterium coli, which is responsible for the patient's diarrhœa, and recommend the isolation of children who may be infected in order to prevent the spread of the disease.

DIGITALIS IN RENAL DISEASE.

This subject has been studied by H. HUCHARD, in a work presented to the Société Médicale des Hôpitaux (*Rev. de Thérapeut. Méd.-Chirur.*, May 15, 1892). Laffon has proved experimentally that digitalis is not eliminated by the kidneys, but that it is destroyed in the organism. According to Huchard, digitalis acts as a diuretic, not by influencing directly the renal epithelium, but by increasing the arterial pressure. The drug is not, therefore, deleterious in congestion of the kidneys. Digitalin in large doses does not produce untoward effects in the various renal affections; on the contrary, it is useful, and often diminishes the amount of albumin, not only in cardiac albuminurias but also in those occurring in parenchymatous nephritis. No matter what the nature of the cardiopathy, whether hyposystolic or asystolic, the bad effects attributed to digitalis are never observed if the following method of administration is adopted: The path to the action of digitalin must from the beginning be made clear. Thus, the patient for a few days previously must be subjected to a diet of milk and absolute rest. A certain amount of diuresis is obtained through these two simple measures. A purge is then administered, and on the following morning 50 drops of a solution of crystallized digitalin, of the strength of 1 to 1000, is to be given once only, followed by the ingestion of 1 milligramme of the crystallized digitalin. After this we must wait for from six to fifteen days before applying the same measures and drug in exactly the same manner described, especially if the indication persist.

PRESCRIPTIONS OF RESORCIN.

According to *Les Nouveaux Remèdes* for May 24, 1892, LASSAR uses the following formulæ when prescribing for diseases of the skin:

A weak paste is made as follows:

℞ Resorcin, ʒiii;
Oxide of zinc,
Starch, of each, ʒvi;
Liquid paraffin, ʒx.

As a more powerful paste he uses:

℞ Resorcin,
Oxide of zinc, of each, ʒv;
Liquid paraffin, ʒx.

TREATMENT OF SYCOSIS.

The *Revue de Thérapeutique Médicale* asserts that KROMAYER employs the following treatment of sycosis with very good results. He applies to the part affected with a tampon the following solution:

℞ Bichloride of mercury, gr. xv;
Alcohol, ℥iiiss. M.
Sig.—Use externally.

By means of these applications he endeavors, through energetic disinfection of the skin, to prevent the formation of new spots of the disease.

The patient is then directed to apply at night the following ointment?

℞ Tannin, gr. xxx;
Precipitated sulphur, ℥i;
Oxide of zinc,
Powdered starch, of each, ℥ii;
Vaseline, ℥vi. M.
Sig.—Use externally.

Each morning the sublimate solution may be applied and the ointment washed off, so that the patient will not be disfigured by the greasy substance during the day.

This treatment is kept up morning and night until a complete cure is obtained. If pustules are present, it is advantageous to incise the pustule, and to cauterize it with a strong solution of nitrate of silver. However, this treatment of scarification, grattage, and incision, with curetting, is to be reserved for those cases in which there is much involvement of the skin, under which circumstances it would be well to employ a moist compress, covered by a piece of rubber dam.

ANALGESIC PROPERTIES OF PISCIDIA ERYTHRINÆ.

The *Revue Internationale de Bibliographie Médicale* for May 25, 1892, publishes a contribution by LIEGEOIS to the *Revue Médicale de l'Est* for April 1, 1892, upon this subject. He believes that the analgesic properties of *Piscidia erythrina* exist in its alkaloid, piscidine. He also believes that this plant is very useful during the menstrual period, and in cases in which there is dysmenorrhœa with irregular menstrual flow. He advises 20 drops every three hours. After from sixty to one hundred and twenty drops have been taken, the regularity of the function is usually established. In certain cases of dysmenorrhœa, the tincture of piscidia erythrina produces excellent results. He prescribed it as follows:

℞ Liquor ammonii acetatis, ℥i;
Tincture of piscidia erythrina,
Tincture of valerian, of each, ℥ii. M.
Sig.—Of this the dose is from 1 to 3 small teaspoonfuls.

Liegeois believes that in the præcordial pains of chlorosis and the different neuroses, in myocarditis with arterio-sclerosis, or, again, in subacute aortitis, this medicament may be advantageously employed. He prescribes under these circumstances 20 to 80 drops a day of the piscidia, continuing the treatment for upward of a month. In his experience the drug proved itself a useful pain reliever in cases of hepatic pain; this has already been pointed out by Ott, of Easton, Pa. The drug, according to this same investigator, raises arterial pressure very considerably.

ON THE TREATMENT OF LOCAL HYPERIDROSIS.

According to the *Journal de Médecine de Paris* for May 29, 1892, BROCQ employs the following treatment for this persistent affection. Twice a day a mixture of naphthol, glycerin, and alcohol in the following proportions is applied to the affected parts:

℞ Naphthol, 5 parts;
Glycerin, 10 parts;
Alcohol, 100 parts.

Or, in other cases, a powder may be employed, either dusted over the part or applied by means of tampons between the digits:

℞ Naphthol, 2 parts;
Starch, 180 parts.

Permanganate of potassium may also be used by wetting a piece of filter-paper or thin cloth with the following solution:

℞ Permanganate of potassium, gr. xv;
Distilled water, ℥iiiss;
Thymol, gr. v.

Or, in other cases, permanganate solution, in 1 to 5 parts to 500 of water, may be applied by means of bandages, and after this the following:

℞ Talc, ℥x;
Subnitrate of bismuth, ℥xi;
Permanganate of potassium, gr xlv;
Salicylate of sodium, gr. xxx.

Or

℞ Powdered rice, ℥ii;
Talc, gr. lxxx;
Subnitrate of bismuth, ℥vii;
Permanganate of potassium, ℥iii.

In some instances astringent lotions, or local baths with alcohol, are useful, such as the following:

℞ Sulphate of quinine, 5 parts;
Alcohol, 100 parts;
Tannin, 1 to 3 parts;
Dilute alcohol, or water, 250 parts.

If a salicylic acid powder is desired, the following may be used:

℞ Salicylic acid, 3 parts;
Starch, 10 parts;
Powdered talc, 90 parts;
Powdered alum, 45 parts.

Or, instead of this, a useful powder is composed of lycopodium, talc, oxide of zinc, calcined magnesia, and the carbonate of lead, with the addition of 1 to 15 of salicylic acid. In other instances the chloride of iron becomes useful. Cold baths of an infusion of walnut-leaves may be used for two days, after which the following may be employed by means of bandages:

℞ Glycerin, ℥iii;
Chloride of iron, ℥i;
Essence of bergamot, gtt. xx.

Carbolic acid, in proportion of three to five per cent., may also prove useful. Atropine internally, with applications of a solution of bichloride of mercury, in the proportion of 1 to 2000, may also be of service, or the following may be used:

℞ Cologne-water, ℥v;
Tincture of belladonna, ℥i.

AN OINTMENT FOR HEMORRHOIDS.

L'Union Médicale for June 4, 1892, recommends the following ointment for hemorrhoids, as employed by KOSOBUDSKI:

℞ Chrysarobin, gr. xiv;
Iodoform, gr. v;
Extract of belladonna, gr. x;
Vaseline, ℥ss. M.

Sig.—This is to be applied as an antiseptic and a soothing ointment.

A LINIMENT FOR NEURALGIA.

L'Union Médicale for June 4, 1892, recommends the employment of the following liniment:

℞ Chloroform, ℥vi;
Sulphuric ether, ℥i;
Spirits of camphor, ℥iii;
Tincture of opium, ℥iss. M.

Sig.—Soak a small piece of flannel with the liniment, and apply over the painful part.

THE USE OF CHLOROFORM IN TUBERCULAR AFFECTIONS.

DESPREZ (*L'Union Médicale*, June 18, 1892) strongly advises the use of chloroform as a rapidly diffusible, safe, and powerful antiseptic agent in tuberculosis and other diseases due to micro-organisms. Since its great value has been demonstrated in cholera, he has used it in pulmonary tuberculosis, in various forms, either as a vapor or taken internally. The usual formula employed is as follows:

℞ Beechwood creosote, grs. xlv;
Alcoholic tincture of cinchona, ℥i;
Pure chloroform, ℥iii;
Malaga wine, ℥x. M.

Sig.—A dessertspoonful in half a glass of water before meals and at bedtime.

This, combined with perfect hygienic and supporting measures, has given in early phthisis such unexpected results, that the writer has been tempted to doubt the correctness of his diagnosis. He has used a spray of chloroform-water in wards where influenza has been raging for months, with the result that this disorder entirely ceased. He has also seen influenza apparently prevented in an institution by the same method. In tubercular and purulent cavities the best results have followed its use. The writer attributes much of its active antiseptic power to the chlorine which it contains, and which is freely liberated.

THE ACTION OF DIGITALIS ON THE PULMONARY CIRCULATION.

In a paper read before the Académie de Médecine, HEGER (*Presse Médicale Belge*, June 19, 1892) concludes that, from the experiments of Bayet, the principal action of digitalis is on the left ventricle and the aortic system, and that it has no direct action on the pulmonary system, and very little on the right side of the heart. Clinically, it is indicated in cardiac weakness, without valvular lesions, or at least mitral insufficiency; it increases the diastole of the left ventricle, and has thus a kind of depleting action on the lungs; it is powerless in pneumonia, according to Masius, except inasmuch as this depleting action tends to draw blood from the lungs. Lefebre and Rommelaere hold the same views as the writer, but consider that his dose of 3 or 4 grammes daily is too high, and they use from 40 to 70 centigrammes.

THE TREATMENT OF CHOLERA.

PROFESSOR OSER (*Wiener Medizinische Blätter*, No. 34) discusses at length the treatment of cholera, which is so enthusiastically recommended by Cantani. This consists in an enema of a one per cent. solution of tannin, in the quantity of two quarts, given by the bowel. The prescription is:

> Inf. flor. chamom., parts 2000;
> Acid. tann., parts 10 to 20;
> Gumm. arab., parts 30;
> Tinct. opii (ammon. ?), parts 2.

Cantani thinks this an aborting remedy for cholera. The injection contracts the vessels, inhibits the bacilli, makes the ptomaïnes possibly less capable of absorption, slightly acidifies the intestinal contents, excites the nervous system, warms the body, and prevents anuria and the drying of the tissue.

Oser thinks the enthusiasm of Cantani and his followers was premature, for, in spite of it, the death-rate remains almost as high as in the epidemics in Naples and elsewhere, which occurred before this treatment was known.

Cantani proposes with the injection of two quarts of the tannin solution to sterilize the bacilli in the whole of the small intestine. Oser questions whether the small intestine is reached at all, for during a number of years he has made many experiments in regard to the sufficiency of the ileo-cæcal valve. He believes that it closes completely even in the cadaver, having reached this view by experiments on corpses.

Oser is not aware whether or not the ileo-cæcal valve is paralyzed in cholera, not having made any experiments to determine this. But he feels sure that it is impossible with two quarts of fluid to wash out the whole small intestine and sterilize the bacilli in the duodenum.

Oser is willing to believe that the diarrhœa disappeared in all the cases so treated by Cantani, but recalls the fact that there are always many cases of intestinal catarrh in a large city, and the number of such would be much increased during a cholera epidemic without it being possible to determine that each one would have resulted in cholera. He thinks the cures were chiefly caused by the absorption of the tannin and opium in the large intestine. Oser would not intimate that the tannin irrigation should not be used during a cholera epidemic, but simply seeks to give warning of the disappointments which are to be expected if too much reliance is placed upon this method.

The hypodermic injection used by Cantani has a much better foundation; this is the injection of large quantities of a fluid containing common salt into the subcutaneous cellular tissue. The idea of overcoming in this way the lack of water in the blood is not new. Oser himself used the same during the epidemic of 1866 in treating a number of asphyxiated patients. In his studies at that time he was convinced that the absorption still took place through the subcutaneous cellular tissue, even if more slowly than normal. To test the power of the subcutaneous cellular tissue to absorb, he injected into the right thigh of a highly cyanotic patient $\frac{1}{21}$ grain of atropine. After thirty minutes the dilatation of the pupils was noticeable, and at the end of twenty minutes more the iris was reduced to a narrow line. Other observations confirmed this. Samuel pleads strongly for the use of such injections of salt, accompanied by the use of massage. The water to be injected was distilled and boiled, to sterilize it. Cantani prepared it, using 1 drachm sodium chloride, ¾ drachm sodium carbonate to 1 quart of water.

The best results were obtained from a temperature of 102° F. In a few cases 104° F. was reached, care being taken to preserve an even temperature. Cantani found the ileo costal region the best place for the injection. The sides of the throat must, as Samuel suggested, be avoided, because in some cases, when they were chosen, suffocation followed from œdema of the glottis.

The amount injected at one time should, according to Cantani, not exceed 51 fluidounces. This is in an asphyxic state. For less drying of the tissue, 27 to 34 fluidounces were enough; in typhoid conditions, 17 to 20 fluidounces were used. In most cases the frequent repetition after a short time was unavoidable, until the pulse came up, the breathing became freer, the cyanosis was lessened, and the secretion of urine was resumed.

The more marked the coolness and paralysis, the warmer he used the injections,—102° to 104° F. In a strong reaction in a typhoid condition, he reduced the temperature to 99° or 100° F.; and when the fever was very high, to 98° F.

Cantani is very much pleased with the results, and concludes, after extensive experience,—

1. The hypodermic injection is an invaluable therapeutic remedy in the treatment of cholera.

2. In order to be of value, it must take place under conditions which render absorption possible. In order to do this, it should immediately follow after a warm mustard-bath of about 104° F.

3. The hypodermic injection, as an absolutely harmless remedy, should be put into use as soon as the case of cholera comes to the physician's notice, and methodically repeated every four hours.

4. To further the absorption, it is well to apply the injection at several, at least at two, places.

5. The hypodermic injection is not to be regarded as an exclusive remedy for cholera, but it can remove the symptoms accompanying the disturbances in circulation, and following this the imperfect formation of the blood.

Patients treated promptly with the hypodermic injection did not show, even when they died, any cyanosis or asphyxia, and the corpse did not show that general dried condition of the tissues which was found when the hypodermic injection had not been used.

Only exceptionally were unpleasant consequences observed which could be ascribed to the injections. Once paralysis of the heart occurred, probably due, as Cantani believes, to the fact that a small vein was ruptured, so that the salt water entered the blood directly. In rare cases abscesses were formed, but could probably be traced to some lack of cleanliness in the instrument or the fluid.

Some observers, among them Minola and Baretta, saw a superficial scab formation of slight extent, and without any effect upon the further course of the disease.

Kronecker suggests a direct and rapid injection of the salt solution into the veins.

Rouvier has injected an "artificial serum," curing eighteen out of fifty-five patients. Bouveret also and Nicolas-Durant have injected the salt infusion directly into the veins, but the result was not encouraging. The former lost six out of seven patients.

Roussel has invented an ingenious apparatus to inject in the vein of the arm. It has also been advised to inject the salt solution into the serous cavities. Richardson proposes the injection into the peritoneal cavity, and Spil into the pleural cavity. The latter tried it on two patients; one recovered, the other died.

In closing, Oser recommends, as founded on his own and other experience, the following therapeutics for cholera:

During a cholera epidemic the cases of diarrhœa must be much more seriously taken than at any other times. The lightest case should be put to bed with warm, dry or moist bandages. Opium should be given in not too small doses, and an injection of the Cantani tannin-opium fluid given. The irrigations certainly have a value in the symptomatic treatment. It is well to stimulate in this stage with wine or cognac in small quantities. If we are dealing with cholerine or cholera, then in the stage of evacuations the subcutaneous injections should be made along with the rectal injections. During the epidemic of 1866, Oser made many trials of this, and found morphine and opium had an excellent result in checking vomiting, and cramps in the calf.

He has observed no good results from the internal use of nitrate of silver, alum, sesquichloride of iron, tannin, etc. Opium internally, or in suppositories, "ice pills," warm or cold tea, with some cognac; for thirst, champagne cooled in ice, red wine, morphine injections have proven the best remedies along with warm external applications. Of course the injection should be used in this stage. Oser recommends after the irrigation the use of an opium suppository, especially in cases where vomiting occurs. He noted in the former epidemic that stimulants cannot be used soon enough. He gave each patient, as soon as he entered the hospital, strong coffee, tea with rum, or strong wine. During the stage of asphyxia it is necessary to warm the skin with warm bottles, rubbing, and hot cloths.

The internal administration of acetic ether on ice, of champagne and cognac, and especially the subcutaneous injection of camphor with ether, are of benefit.

Oser often noted the result of the latter. Even if the pulse was vanishing, or had disappeared, the heart action may be excited again by one or more such injections. This is, it is true, usually only for a short time, and then the injection must be repeated. He noted no good results from morphine in this stage. The muscle cramps disappeared, it is true, but the collapse advanced rapidly, in spite of all the means used. Irritation of the skin by sinapisms must be enough in this stage.

Oser has not noted any good result from either warm or cold baths in the asphyxic stage. The patients suffer fearfully from oppression, and this appears to be considerably increased in the bath. At this stage the hypodermic injection of salt solution is in place.

It should be used in all cases where the blood is thickened by frequent evacuations, probably with good results. Although too great hopes must not be placed upon it, because in most severe cases the process advances undelayed, even if water is introduced into the blood.

In a reaction state one must proceed symptomatically. Frequent drinking of small quantities of fluid; ice bandages on the head for pain or delirium. Then in the typhoid stage, for vomiting, morphine injections; for anuria, warm baths, frequent drinks, internally acetate of potassium. Oser has noted no beneficial results in such conditions from benzoin flowers, which Oppolzer commends so warmly. The cholera epidemic makes great demands upon the physician. Conditions change rapidly, calling for a rapid change in treatment. If the assistance of the physician was needed in using the subcutaneous injections, so much the more is it in the use of the rectal injections and hypodermic injections of salines. To be of aid to the cholera patient, Oser believes from his experience that the physician must almost always be at the patient's side in the decisive hours, and he believes he can accomplish much there, even if the disinfecting methods of cure, which should deal with the cholera germ itself, do not avail. He does not think either optimism or pessimism justified, but believes that by well-informed, energetic action, as well in a prophylactic as in a therapeutic relation, not a little may be achieved.

INFLUENCE OF WINE UPON THE DEVELOPMENT OF TYPHOID AND CHOLERA BACILLI.

Dr. Alois Pick (*Centralblatt für Bakteriologie*, xii. 9) says that for a long time it has been recommended during typhoid fever and cholera epidemics that wine be added to the drinking-water. Filled with a desire to test this generally-accepted view by precise bacteriological experiments, Pick made a number of experiments in the hygienic institute in Vienna in the following manner:

First, fresh supplies of typhoid and cholera bacilli were prepared; then five Erlenmeier bulbs were filled with water, wine, and equal parts of water mixed with wine. No. 1 held five drachms sterilized water; No. 2, two and a half drachms white wine and two and a half drachms water; No. 3 held five drachms white wine; No. 4, two and a half drachms red wine and two and a half drachms water; No. 5, five drachms red wine; each with a quarter of a drachm of typhoid or cholera deposits added. Of each of these mixtures, after standing one-quarter to one-half hour, a scoopful was placed in gelatin, agar-agar, and bouillon. After the lapse of twenty-four hours, inoculations were made in the same manner. These showed that, after a short action of the thinned wine, or wine mixed with equal parts of water, there was a marked decrease in the number of surviving germs of the typhoid bacilli. After an action of twenty-four hours, not a single colony of the typhoid bacilli developed, although the water tests showed in both cases great quantities of colonies.

In still greater measure was shown the action of the wine, or the wine and water, upon the development of the cholera vibrios, for after an action of but from ten to fifteen minutes, no living vibrios could be found. The same result followed the twenty-four hour action. During a prevalence of a typhoid or cholera epidemic, it is, therefore, advisable to add to the drinking-water an equal quantity of wine, and it will be an object of further investigation to determine how far the thinning of the wine may be carried, and how long these mixtures should be allowed to stand, in order to be certain that the germs of typhoid or cholera contained in the water are entirely destroyed. It will also be advisable only to drink the wine from vessels in which it has already stood for twenty-four hours, and to mix the water and wine twenty-four hours before its use.

TREATMENT OF CHOLERA.

Dr. Rieder (*Ärztliche Rundschau*, No. 37, 1892) reports some of his experiences in the general hospital in Hamburg. No results worth mentioning have been noted from the use of the subcutaneous salt infusion. On the other hand, with the intravenous salt infusion, at least at first, very good results, which were verified in about two thirds of the cases, were obtained. Among the cases were some patients who were very asphyxic, and yet were still alive after a number of days. Whether the result will prove permanent could not yet be said. At any rate, others not treated died very quickly. To one woman the intravenous infusion was given three times; she was still living. In many cases the pulse only improves temporarily; in others it remains good after the first injection. The latter have a good prospect of recovery. The patients bear two to four quarts of salt solution very well. The secretion of urine was increased in almost all cases after the injection, without this symp-

tom having the favorable critical importance which is ascribed to it by many observers. On the whole, Rieder found more favorable results among the men than among the women, for the disease seemed to have a more rapid and severe course with women.

The following suggestions are gathered from various medical journals:

As the taking of medicine is made difficult in cholera by the vomiting, Rosenbach commends the giving of the chief remedy, opium, by subcutaneous injections. The injections are very efficient and not painful.

P. Guttmann commends a .75 per cent. infusion of common salt, "which, at least, shows that the pulse is better after it. Its use is so simple as to be possible for every physician."

For the treatment of the algid stage, Dr. S. Mayländer advocates the method of Dr. Giacich, which is aimed specially to increase the heart action,—the internal use of ammonia, 1 to 500; subcutaneous injections of sulphuric ether, 1 to 10; and generous use of alcohol. This treatment was often followed by a surprising result; the patient improved after only two hours; the temperature, which had sunk below normal, began to rise; the pulse increased and became fuller, the breathing became quieter and deeper; the expression of face freer and more animated; in short, complete recovery followed. For later treatment, baths at 82° F. proved very excellent. In this manner more than fifty per cent. of the patients already in the algid stage ought to be saved.

In the great panic which has seized all cautious minds, and caused a regular migration from the region near the cholera epidemic, it is interesting to note some places which have immunity from cholera.

In Bavaria, these are Nuremberg, Würzburg, Traunstein, as well as most places in the upper Bavarian mountains, in so far as they do not lie close along the rivers. In Würtemberg, Baden, and Hesse most places are unfavorable to cholera. There were, indeed, in former epidemics a few isolated cases brought in, but the disease found no hold among the inhabitants. In Saxony, Freiberg, the high mountain city, is entirely immune. Dresden is only in a slight degree susceptible; the whole Saxon mountain region has up to this time been almost entirely spared.

In Silesia, where severe epidemics have often occurred, the cities of Falkenberg, Pless, Nikolai, Rybrick, and Lublinitz have shown themselves as insusceptible.

The very latest means for destroying the cholera germs within the human intestine (it is still in the experiment stage) is ammoniotetrasulphate of potassium, which possesses the remarkable property of reacting neutrally in an ordinary temperature, but resolving itself at blood heat into an acid sulphate. Taken with the meal, it remains neutral in the stomach, but in the intestine it gives off its acid combination, and, in fact, the more freely the further it proceeds in the intestine. A dose of 90 grains was borne well by a dog. The powder is odorless and tasteless. The theory of acidifying the contents of the intestine is at least free from objection, and awaits only the trifle of practical tests, which ambitious experimenters will soon perform. Finally, it should still be remarked that the Brown-Séquard testicle extract has been tried in Paris. Result: death of the patient.

TRANSFUSION METHODS IN THE TREATMENT OF CHOLERA.

KUTNER (*Deutsche Medicinische Wochenschrift*, No. 35, 1892) groups together the subcutaneous and intravenous methods of treating cholera.

1. The continued subcutaneous infusion, according to Samuel. Of this it is remarked:

Time of use: as early as possible, as soon as the radial pulse is abnormal. Choice of place for injection: infraclavicular fossa, each side alternately, eventually also the supraclavicular fossa. The injection is to be stopped if the absorption is slow. Manner and form of use: continuously during the whole duration of the enteric asphyxic stage to deep into the typhoid stage, even after the secretion of urine is again in progress.

Keppler injects at first on both sides, 15½ fluidrachms; as soon as it is absorbed (one minute), 13½ drachms more, and so on until the pulse is perceptible. When a swelling begins to form (stoppage of absorption) its disappearance is awaited. If the pulse is present, repetition in five minutes; if it is full, at half-hour intervals.

Keppler stops the injection when the secretion of urine begins, but repeats it once on the occurrence of a new attack. Eight to twelve quarts of the solution are ordinarily used. Composition of the fluid: one drachm common salt to one quart of distilled water. Temperature, 102° to 104° F. Instrument and technique: at the head of the bed hangs an Esmarch irrigator, or rather a Collin's transfuser. Puncture is by means of a fine, well-disinfected trochar, whose canula, after the

withdrawal of the stilette, is connected with the irrigator-tube. The canula remains *in situ* even after the infusion is completed; the same course is followed at the other places used for puncture. Convalescence: scrupulous saving of the patient's strength, even when recovery appears rapid, and strictest diet. During illness, only chopped ice; on return of appetite, thin meat broth (with egg), eggnog, black coffee.

The chief value of the methods depends, says Keppler, upon the earliest possible use of it. It is worthless if the kidneys are diseased before the attack of cholera, as may be the case in drunkards.

2. The Hayem intravenous transfusion. Technically more difficult and more dangerous, the intravenous transfusion has been used with surprising results during the present epidemic in France. The sterilized fluid: common salt, 1¼ drachms; 34 fluidounces of distilled water; to it suitable additions of sodii sulph. may be increased to 6½ drachms per quart. The transfusion is best made by means of a Collin's transfuser; 2 to 2½ quarts are injected in a quarter of an hour. If the pulse becomes thready again, then a second injection follows ten to twelve hours after the first. The action follows much more rapidly than after the subcutaneous injection, and is often instantaneous.

The fluid is drawn from the funnel of the transfuser into the pump, and from the pump into the tube. The distributing chamber of the transfuser is a cylinder, which communicates through three openings with the funnel. It contains a round ball of aluminum, whose specific gravity is arranged according to the solution to be injected (blood or a solution of common salt), so that it is less than that of the solution. Hence the ball serves as a valve, and prevents, during the injection, the fluid from flowing back into the funnel or air from entering the veins.

Similar to Samuel's infusion is the treatment recommended by H. Neumann. According to him, at least 3½ to 10 fluidounces must be injected for children, and 34 to 51 for adults. The fluid to be injected is physiological solution of common salt to which one-tenth of one per cent. of sodium carbonate may also be added. If it is desired to combine medicinal action with the injection, absolute alcohol (one per cent.) may be added. Cantani takes to 1 quart of water 1 drachm sodii chlor., and ¾ drachm sodii carbonatis. The fluid should at least be of the temperature of the body; but if the temperature is below normal, it is well to increase that of the solution to 107°.

For hospital use the injection fluid is placed in glass cylinders or medicine bottles, which are closed with cotton wadding, and placed in a sterilizer to be heated, and then directly, without pouring out, allowed to flow by gravity under the skin. There is a doubly perforated rubber stopper, mounted with a short glass tube closed with wadding, to provide access for air, and a second tube reaching to the floor, but which is bent in the opposite direction, and connected with a rubber tube one to one and a half yards long. The stopper with glass tube and rubber tube are sterilized in steam and then placed on the flask. By tipping the bottle or by a ball syringe the water is forced into the tube, so that it flows constantly. To keep the fluid at the temperature of the body, the flask is placed in a bucket of warm water, and this placed about one yard above the patient, or hung on a cross-bar for permanent irrigation. For the injection a trocar and canula, of 1 to 1.5 millimetres diameter, which has been disinfected in the usual way, are used.

The apparatus must be much more simple in practice. In a clean cooking utensil (perhaps best of all a tea kettle), a measured amount of water is allowed to boil from ten to fifteen minutes, and the corresponding amount of salt shaken in towards the end of this time (one heaped teaspoon to a quart of water). The kettle, with properly cooled fluid, is placed on a spindle or ladder, and the fluid allowed to flow through a disinfected tube irrigator. If the canula is not too small, great quantities of fluid may in this manner, without further assistance, be brought beneath the skin.

The injection is best made in the inguinal region, with the end of the canula turned towards the middle line of the body. The canula should lie parallel with the surface of the skin, at any rate, rather inclining towards the skin than inward. During the flow the canula is pressed slowly forward, in order to distribute the fluid in a great space and to prevent its flowing from the place of injection. The lump which gradually forms is kneaded rather firmly with the fingers of one hand, while the canula is held by the other. Larger quantities of fluid are better diffused from two separate places. The puncture is closed at once with adhesive plaster. If an abscess should form later, this will not be worthy of consideration compared to the momentary life-saving action of the transfusion.—*Arztliche Rundschau*, No. 37, 1892.

UPON THE ARTIFICIAL PROTECTION, BY INJECTION OF ANIMALS, AGAINST "CHOLERA ASIATICA."

PROFESSOR DR. L. BRIEGER, in an article in the *Deutsche Medicinische Wochenschrift* (No. 31), August 4, 1892, contributes the following remarks: In an article we published with Kitasato we reported a process that enabled us to make guinea-pigs capable of resisting the effects of an injection of Koch's cholera bacilli.

The method then employed by us depended on the breeding of cholera bacilli in a watery extract of an organ rich in cells, as the thymus salves. We have taken unremitting pains to further test this procedure, and find a simpler method, giving sure results.

Professor Koch has constantly been interested in these experiments, and has helped us with his valuable experience, for which he has our warmest thanks.

All our researches were carried on with a "Massauah" original culture, and at first with a thymus extract. We proceeded in this manner: The cholera bacilli was permitted to grow for twenty-four hours on the thymus extract surface; then warmed to 65° C. for fifteen minutes, or to 80° C. for ten minutes. Then put in a refrigerator for twenty-four hours; after that the animals were subjected to the preparatory treatment with it. We used guinea-pigs exclusively, and gave the animal four cubic centimetres of this fluid intraperitoneally for four days successively.

The animals were then, as we have already written, particularly after the first injection, more or less attacked with decided illness, that had by the next day passed away. The temperature of the body showed during this time certain striking fluctuations. In very slight cases the animal experimented upon would react in from three to five hours with heightened temperature up to 40° C. The normal temperature of guinea-pigs lies between 38° and 39° C. If, however, severe symptoms occurred in the guinea-pig, the temperature of the body goes down for some hours, 2° or 3° below the normal. All these animals had by the next day returned to complete health. Further use of the injection presented the same effect in a much slighter degree.

The animals previously treated in this way exhibited at once after the last injection—*i.e.*, about four or five days after the first one—the ability to withstand the cholera bacilli, and, indeed, they withstood three times the dose which would kill unprepared animals in twelve or fifteen hours.

Immediately after the injection of such completely virulent cholera cultures the temperature of the treated animals rose above the normal, and then in the course of two or three hours fell about 2° to 3° C.

The compared animals by this time were relaxed, laid on their sides, had frequent convulsive spasms, and their temperature had fallen to 32° C.

These animals died; while the treated animals by the next morning had completely recovered.

We have sought further for the minimum quantity of this protective fluid necessary to make the guinea-pig resist the fatal dose of fully virulent cholera cultures. From our experience one cubic centimetre of the above-described liquid injected for two days successively is enough to give the desired result in a guinea-pig of three to four hundred grammes.

But as this method presents certain difficulties due to manipulation of the thymus, we tried to find a simpler way, at the suggestion of Professor Koch, which would give equally favorable results.

It seemed to come nearest to the purpose, to breed the cholera bacilli in the usual peptonized meat-broth, and to heat these cultures on the next day for fifteen minutes to 65° C. The animals were then treated with this fluid in an analogous manner, as those above mentioned. All the animals treated in this way have withstood a double dose of fully poisonous cholera cultures, while the control animals succumbed to the cholera. The smallest dose of heated broth which still exerted the power of protection was here also two cubic centimetres. This protection followed in forty-eight hours after the first injection, and lasted for about two months, corresponding to our first publication.

So we treated animals in this way on May 12, 1892, then in forty-eight hours afterwards, on May 14, 1892, with completely virulent cholera cultures. These animals kept in perfect health; and then on July 16, 1892, they received again double the poisonous dose. The control animals died the next day, while the prepared animals were perfectly able to bear the second injection of fully virulent cultures and yet remain quite well.

This seems to show that the cholera bacilli was so changed by simple heating as to lose their poisonousness, while the *immunizing properties remained.* Our former methods seemed open to the objection that the action of heat alone was necessary.

We made a new experiment by adding some cholera vibrios, scratched from an agar culture, to the thymus extract, leaving it on ice some days.

With the fluid prepared in this way, by not being heated, we obtained the *same* degree of *immunity*, thereby showing that the thymus gland provides the specific effect, as stated in our earlier researches.

In later researches and publications the cause for this immunity will be given.

THE TREATMENT OF ACUTE AND CHRONIC CATARRH OF THE BLADDER WITH SALOL.

Dr. B. Arnold (*Therapeutische Monatshefte*, May, 1892), in commending anew the use of salol for catarrh of the bladder, completes the history of a case of which he wrote several years ago. This 80-year old man was treated, up to the time of his death from influenza, with salol and two introductions of the catheter daily, from February, 1888, to December, 1889.

In February, 1889, Dr. Arnold tried giving him hydrochinon twice a day, in doses of ⅔ grain, giving a total of twenty-four doses. At first it did well, but then there was a marked brownish color of the urine, stomach disturbances occurred, and the dose was discontinued. From June, 1889, he had the bladder washed out twice daily, at first with boric-acid water; but as this caused pain, it was replaced by a weak solution of permanganate of potassium. The patient stood this well; it lessened the bad odor, but not the cloudiness and formation of sediment in the urine, although used at first twice and then once daily, along with two daily applications of the catheter. The patient demanded his salol powders again. When he had taken them (15 grains) three times a day, along with the local treatment, the urine again became clear, and the sediment disappeared. Dr. Arnold by no means thinks the salol will avail without the use of local treatment also.

He has also used salol in the treatment of acute cystitis. A very vigorous man of 70, who had suffered with stricture of the urethra for twenty-eight years, was seized with a chill on May 4, 1888, after the usual introduction of the bougie. The following day the urine was very cloudy, and gave an alkaline reaction, with constant impulse to urinate. The salol powders were given in the evening,—at 11 P.M. and 5 A.M. The urine collected up to midnight still gave an alkaline reaction; that of the morning was slightly acid, less cloudy, and of a faint olive-green color. On the 7th the urine was a dirty olive-green, acid, strangury; less painful and not so frequent; the sediment no longer thick and slimy, but in smaller quantity. On the 8th of May recovery was progressing; there was copious diuresis. On the 9th the urine was not so green, the sediment lighter, flaky, constantly diminishing. From the 11th the patient received salol twice a day. He got up on the 15th. This caused a slight set-back, and he received the powders daily, with rest in bed. After two days he was again much better, the urine was clear; the salol powders were given a few times more, and, assisted by lukewarm baths, recovery advanced rapidly.

In the spring of 1889 a 40-year old woman contracted catarrh of the bladder after an operation of prolapsus uteri. Chlorate of potassium, with morphine, ordered as a medicine by the operator, gave relief, but its long-continued use disturbed the digestion. In a repeated attack, Dr. Arnold ordered salol; it was successful, curing the catarrh very quickly, and there has been no attack since then.

Dr. Arnold has repeatedly used salol successfully for cystitis; even in cases of tubercular origin it effected a temporary relief. A woman with consumption of the lungs had the strong, purulent sediment in the urine much diminished. A man of 24 years of age, who died of tubercular meningitis, with cheesy deposits in the prostate and left kidney, always experienced marked improvement of his chronic cystitis when salol was used.

Dr. Feilchenfeld has also reported cases of the like successful use of salol. He notes what had not been observed by others, that occasionally salol must be given up, on account of its causing strangury. Professor Demme treated a 5 year old boy with salol, for whom the ordinary treatment gave only temporary relief, using daily 22 grains, later 30 to 38 grains, and effected a cure in fourteen days.

Dr. Arnold did not find an increase of irritation in his patients, even when 30 grains were given every three hours; on the contrary, fever and strangury diminished.

His experience seems to show that,—1. Salol makes alkaline urine acid. 2. It removes the foul odor. 3. The cloudy urine clears up, the purulent, slimy sediment diminishes steadily, grows lighter, flaky, and usually disappears altogether. 4. As a rule, the quantity of urine is lessened. 5. The remedy is borne very well and for a long time by the stomach. This excellent quality of salol seems

to have been overlooked. In this respect it surpasses all other remedies recommended for cystitis. It may be because the salol is absolutely insoluble in the gastric juice, and only forms itself into salicylic acid and carbolic acid in the intestine upon the entrance of the pancreatic juice. 6. It is a good assistant in washing the bladder, especially when only a slightly antiseptic solution can be borne.

Of course, it is understood that in using salol the general rules for the treatment of cystitis must not be neglected.

Dr. Arnold does not consider salol a panacea for acute and chronic catarrh of the bladder, but such a good remedy that it can compete with the best ones employed.

THE BATH TREATMENT OF ECZEMA.

Dr. Oscar Lassar (*Therapeutische Monatshefte*, May, 1892) thinks that if the old, erroneous idea that all water and bathing is harmful to eczema and other skin-diseases could be overcome, the bathing-resorts could not hold the patients who would flock to them to be treated for these troubles. He has himself treated much more than ten thousand cases of eczema of various origin, and only once had occasion to interrupt the use of baths or local fomentations on account of a contraindication. Fresh cases, and cases of years' standing, even those from which old-accepted doctrines would keep every drop of water away, yield to his treatment rapidly. He believes that the cleanliness attained is just as valuable an assistant to the dermatologist as to the surgeon. But not by any means would he limit his therapeutics of skin-diseases to baths.

After the bath, he would use appropriate pastes, powders, salves, and oils the more energetically, for the very reason that they would only remain upon the skin until the next bath, after which they would be renewed or replaced by still better ones. He thinks the whole regimen of the bath-cure very valuable, and Berlin pipe-water even will be useful in a degree.

BATH TREATMENT FOR SKIN-DISEASES.

Dr. Edmund Saalfeld takes a more moderate view in regard to the usefulness of bathing in treating skin-diseases in general and eczema in particular. He would recommend bathing where a macerating action is desired, where it is desired to bring about a lessening of infiltration, or to soothe the skin, but not where there is a skin-disease in the stage of inflammation. He thinks for chronic, dry, especially infiltrating eczema, a good result may often be obtained by the use of baths. By no other means can that most prominent symptom of chronic eczema—the constantly-recurring formation of scales—be removed so readily as by the warm bath, especially when agents of various kinds, such as tar, alkalies, soaps, or the like, are added, or when there are appropriate qualities present in the natural spring, such as sulphur.

However, Dr. Saalfeld would not have it forgotten that some eczema can absolutely not stand the use of water. So he thinks the use of baths in general unadvisable for acute eczema; for some such even a sojourn in a damp climate is injurious.

By "baths," he would refer to the whole *régime* of a bath-resort. Eczema, when caused by affection of the digestive tract, or chlorosis, or diseases of the female sexual organs, will be helped by a bath-cure if it has a favorable effect on these internal disorders. He refers to the bad effect of sea air and sea bathing upon eczema, and also upon all patients inclining to the itch, the latter being always rendered worse when any mechanical irritation of the skin occurs.

On the other hand, a nervous itching of the skin, for which no cause can be found, may be greatly relieved by protracted lukewarm or tar-baths.

HYDRASTININ FOR UTERINE HEMORRHAGE.

To the well-deserved attention of physicians Dr. S. Gottschalk again brings muriate of hydrastinin (*Therapeutische Monatshefte*, May, 1892). He has already written of the use of this drug for uterine hemorrhage; but, after more extensive use, can speak still more confidently in its praise. He used it sometimes by subcutaneous injection and sometimes internally. For the injection, he chose the region of the glutei, never having seen infiltration or even a bluish-black discoloration of the skin result from its use here, such as Abel reports following injection in the epigastric region. He also found by experience that the injections had a more rapid result than the dose taken internally, but cannot agree with Abel in thinking no result obtainable from the latter. To the patient who fears the needle he unhesitatingly gives the dose by the mouth. Of course, this must be done very carefully. More than $\frac{1}{6}$ grain three times a day should never be given internally, because otherwise

there is danger of causing very unpleasant gastric troubles.

Gottschalk does not agree with L. Landau in thinking the alkaloid more easily digested than the fluid extract of hydrastis canadensis. However, he has repeatedly observed nausea and stomach-ache as soon as more than five-sixths grain of hydrastinin had been given. As long as the fluid extract is given, in the customary doses of 20 drops three times daily, no unpleasant action will be experienced. In this respect the alkaloid has scarcely any advantage over the fluid extract. On the other hand, the action of the alkaloid is much more to be relied upon than that of the fluid extract; it works more quickly and surely.

Of course, it is not to be supposed that we possess in hydrastinin a sovereign remedy for all possible forms of uterine hemorrhage; only in certain kinds of menorrhagia and metrorrhagia can one be confident of success, and then it is chiefly palliative. The hydrastinin is not calculated to stop immediately a profuse uterine hemorrhage. This is explained by its physiological properties. Hydrastinin acts exclusively upon the vascular system, especially upon the vascular walls, causing vascular contraction, but not a vascular closing, such as is necessary in puerperal hemorrhages; for this purpose it cannot replace ergot, which acts directly upon the muscle of the uterus. Ergot is preferable in all cases where a contraction of the uterine muscles is to be obtained. Gottschalk has also not found hydrastinin of special value in myoma or carcinoma, nor been able to observe even a lessening of the hemorrhage in non-operative carcinoma.

After these necessary limitations he proceeds to name the cases in which his experience has shown hydrastinin useful:

1. First of all, in those uterine hemorrhages which are traceable to a pronounced congestion of the uterus. To these belong, above all, the often very profuse menorrhagias of spinsters, in whom there is no pathological change in the condition of the genitals. In some of these cases it is possible to obtain a permanent result, so that even after discontinuing the remedy the menstrual flow remains smaller.

2. Also in hemorrhages, which have their pathological and anatomical cause in endometritis, hydrastinin will lessen the quantity of blood; but here, according to his experience, the action is only palliative, not being sufficient alone to cure the local cause of the trouble.

3. For prophylactic or intramenstrual use, hydrastinin is useful before or during the first returning profuse menstruation after an abrasion of the uterine mucosa. It is well known that this menstruation, usually occurring after six weeks, is often very profuse. In the very cases where there was great loss of blood before the operation, it is of great importance to prevent further profuse hemorrhage. This is possible if the treatment with hydrastinin is begun several days before the expected menstruation, and, if necessary, continued during the duration of the menstruation.

4. Menorrhagias caused by retro-flexio uteri are best treated by correction of the malposition; but for cases of fixed retroflexion, where the reposition is not yet possible, hydrastinin is a commendable remedy.

5. Secondary uterine hemorrhages—*i.e.*, those caused by a change of the adnexa and their surroundings—offer a large field for the successful use of hydrastinin. To these belong the menorrhagia and metrorrhagia with pyosalpinx, oöphoritis, ovarian tumors, and exsudations. Of course, the cause of the trouble is not influenced by the remedy.

6. Climacteric menorrhagias are much diminished by a faithfully carried out hydrastinin treatment.

The result in any given case cannot be absolutely predicted.

THE THERAPEUTICS OF FALLING OF THE HAIR.

Dr. H. Paschkis (*Centralblatt für die Gesammte Therapie*, June, 1892) thinks the hair-dressers and barbers are the ones consulted usually by people suffering from a loss of hair. As long as the cause is only skin deep, the remedies usually applied are frequently successful, although the most unsuitable remedies are often used with fidelity before the sufferer decides to consult a physician. Paschkis does not attempt to name all the diseases of the scalp, but only those which occur most frequently. It is well known that many skin-diseases, when they attack the scalp, lead to a loss of hair, chiefly confined to the diseased places. The prognosis of such cases usually depends in the depth to which the disease has reached. Of course, it is most favorable when the disease is superficial, affecting only the epidermis, as, for example, in psoriasis vulgaris, which often exists for years without causing any loss of hair worth mentioning.

Besides the local there are often general diseases which lead to the loss of hair. Midway between the local and special troubles is erysipelas. Here the loss of hair has a double

cause. It is locally caused by the erysipelas making an inflammatory infiltration and thickening of the scalp, which leads mechanically, and by the hinderance of nourishment, to the falling of healthy hair. On the other hand, this is also caused by the general decrease of nourishment following an acute infectious fever, and also by a temporary atrophy of hair-follicles and the hair itself.

Sometimes the hair falls when the erysipelas has not invaded the hair. The cause is here the same as when it falls after any other fever. In all these cases the falling of the hair is stopped by the cure of the disease. In chlorosis, arsenic does specially good service, without our being able to ascribe to it any direct action upon the scalp.

Other forms of falling hair may be divided into two groups. The first comprises those in which the fall is caused by seborrhœa of the scalp, and therefore through hypersecretion; the other, those in which simple formation of scales, pityriasis, and insufficient secretion of the sebaceous glands, is present.

In the first, the hair is oily, shiny, apparently thick, with great quantities of small and large scales in it. These forms are best treated by the use of the usual remedies and numerous preparations, as far as these are not fatty or pomades, for the fat needs to be removed. Washing with alkaline soaps is valuable. Of these, the spiritus saponis alkalinus is often not well borne, and Paschkis commends instead of it one of the many so called medicated soaps which are soluble in water, and then can be mixed with some soda or potash (one to one and a half ounces of soap to two and a half drachms of soda, dissolved in one pint of water). Gude's fluid soap, with the addition of one per cent. of carbonate of potassium, is also useful. Ten to fourteen washings in fourteen days will often produce surprising results. According to the intensity of the attack, the soap is to be rubbed in with more or less energy, and the lather allowed to stay on from ten minutes to several hours. The washing with soap is often quite difficult for the long hair of women, felting the hair together. In such cases the lather must not remain, but rubbings of from one-fourth to one-half an hour be used, or else a simple two to five per cent. solution of caustic soda. Soap and alkalies rapidly remove the fat from the hair, making it appear lighter in color or gray. These evils can be removed by further measures, such as oiling. While these substances dissolve and remove the oil from the hair, alcohol simply dissolves it. The action of most hair-tonics is due to the strong alcohol contained in them, which has the same fault as the alkalies, as it produces brittleness, and besides, even when very concentrated, does not entirely remove the fat.

Ether, which does remove the oil, is unpleasant to many on account of its odor. Paschkis uses instead of this benzol (not petroleum, but coal-tar benzine, 50 parts to 100 of absolute alcohol). Both of these must be used only by daylight. In many cases all of the remedies mentioned fail. The many aromatic remedies should then be tried. Often a good result may be obtained from a one to three per cent. solution of naphthol in alcohol; from a concentrated resorcin solution (resorcin, 5 parts; alcohol, 150 parts; ol. ricini, 2 parts); less frequently from salicylic acid. Tar is only occasionally of use, although it and β-naphthol are used with great advantage as soaps. They are to be used just like the alkaline soaps. But these remedies are far surpassed by ichthyol, which Paschkis has used with excellent results for two years. It can be had as a soap or a salve, ten or twenty per cent. strength, with lanolin. The use of the salve must be preceded by at least one energetic washing with the soap.

Dilute mineral acids may often be applied with benefit, not as washes, but simply rubbed in; best of all with a small sponge. Occasionally Burow's solution, much diluted (1 to 10 to 20), and freely rubbed on the head and allowed to dry, is excellent.

But all these remedies are really only preparatory to the use of tonic and preservative remedies, the use of the fat reducing substances to be continued in milder form.

Tannic acid and quinine are valuable in the form of an alcoholic solution, rubbed in the scalp every night; sometimes the pomade is also good.

Balsams are slightly astringent and tonic, but must be carefully used. The pomade prepared by Hebra is good for the trial (bals. peruv., 2 parts; ungt. pomad., 80 parts). Sometimes a remedy which is useless alone is valuable in combination, so balsam may be combined with acids with good result. But these preparations, if concentrated, are often the cause of bad headache, and are only valuable when diluted.

If the patient is a docile one, the prognosis of seborrhœic alopecia is favorable. It is necessary that the patient visit the physician from time to time. The treatment must be continued for months. Often a slight interruption causes the disease to return with almost the original severity.

The cure of all other forms is much more difficult.

When the scalp is dry and badly nourished, the use of soap is out of place. For these cases oil and pomades are to be used to make the skin more pliant and elastic, and the light massage of rubbing them in is also valuable.

Lassar's cure should be mentioned here. It consists in soaping the scalp with an alkaline or tar soap, then in rubbing with a two-tenths of one per cent. watery solution of corrosive sublimate in alcohol, after which the head should be rubbed dry with spirits of naphthol, and finally with a two per cent. salicylic acid oil.

Lassar proposed this methodical treatment in view of the supposed parasitic nature of most alopecias. In seborrhœic and atrophic alopecias it may be used, but in the latter cases Paschkis either omits the washing with soap or uses it less frequently, and chooses a mild soap, using instead of these spirits and oil with quinine, tannin, balsam, etc. If everything else fails, stimulating remedies should be used,—tinct. cantharidis, 2 or 3 parts to 50 of an alcoholic tincture; ol. savinæ, 10 to 15 gtt. to 50 parts alcohol and cologne. These are to be vigorously rubbed in the scalp daily, or three times a week, with a brush or sponge. For a change, or to mollify the irritating action of these remedies, an energetic application of oil may be made immediately following the other. Many of these cases are combined with hyperidrosis. Perhaps both are of nervous origin. If an excessive secretion of perspiration is noted, it must be stopped if possible. Hyperidrosis alone should have, besides the treatment mentioned, a mild massage of the scalp and internal treatment with iron and arsenic, to improve the general condition.

To the most unpleasant, unsightly cases belong those atrophic alopecias, in which coarse, thick hairs are found on a dry scalp without baldness. These cases are practically hopeless.

There is also not much hope where young men become prematurely bald at the same age at which this occurred to their fathers. Here one thinks it inherited rather than of an infectious nature. This hereditary alopecia rarely attacks girls. Perhaps because these give more attention to the care of their hair, and wear more suitable, better ventilated head-gear.

Pilocarpine he has never seen produce cure by external or internal use. Alopecia demands, according to its nature in each case, disinfecting or stimulating remedies, but therapeutics are powerless; its rare cure results not from medication, but spontaneously.

THE ACTION OF SALIPYRIN.

Dr. Richard Hitschmann (*Zeitschrift für Therapie*, June 15, 1892) tells of careful experiments made with the new drug, prepared by Riedel from salicylic acid and antipyrin, and called salipyrin. He made trial of it, as to its antipyretic action, in a number of cases of typhoid fever, migraine, erysipelas, pulmonary tuberculosis, puerperal fever, acute articular rheumatism, influenza, bronchitis, and angina tonsillaris. Pneumonia was excluded entirely, because at that time it was being treated with large doses of digitalis.

The results were as follows:

1. In small doses, or in doses of 15 grains, which are distributed over a longer time, the antithermic action is either entirely lacking or inconstant.

2. Large quantities taken at short intervals showed, in so far as they could be endured, a rapid but not lasting diminution of temperature.

3. Towards evening salipyrin was more effective. The higher the temperatures were when it was used, the better its action; the nearer the temperature to normal, the less its action.

4. Hitschmann experimented upon himself and others, and found that normal temperatures were not perceptibly affected even by large quantities of salipyrin; no subnormal temperatures resulted.

5. Where salipyrin was given as an antipyretic, the frequency of pulse and respiration remained unchanged. The blood pressure showed but a slight diminution in rare cases, after specially large quantities had been given.

6. The pulse-curve showed an increased dilatation of the vessels, after large doses, if a lessening of the fever occurred, while a dicrotic pulse, which existed before, disappeared after the salipyrin, and the elastic elevation became more distinct.

The action of salipyrin upon articular rheumatism was by no means brilliant. There was, indeed, a favorable action, occasionally a cure, but very often during the treatment with salipyrin the inflammatory process attacked one or more or other joints, or the one first attacked relapsed. In chronic rheumatism the salipyrin was entirely unreliable. There was, to be sure, now and then, a slight decrease of pain, but it was never lasting, nor was there any definite loss of pain or removal of the stiffness of the joints. One patient left the hospital, impatient at the unpleasantness of the use of the drug and the slow progress of the treatment. The others were then speedily improved by the use of massage.

What salipyrin achieved as a specific for influenza can be told in a few words. It cannot be denied that severe headache usually disappears after a few grains of salipyrin, but the pains in the limbs do not vanish so readily. As prophylactic against pneumonia and other complications, it did not act, nor did it have even the slightest effect on bronchitis or the accompanying sore feeling of the chest. That salipyrin shortened the course of the fever in influenza, as is claimed by Gogrewe, was not shown by Hitschmann's experiments, and is doubtless due to its antipyretic action.

He only tried it in a few cases of cold in the head. It lessened the headache and the accompanying miserable feeling considerably, but had no influence upon the secretion, and did not shorten the duration of the disease.

The best results observed were of its action as an antineuralgic. He treated four cases of chronic myelitis, with lancinating pains in the lower extremities and in the loins. Two of the patients were relieved after four doses of 7½ grains a day, remaining free from pain the whole day. But the other two, who were already in advanced stages of the disease, experienced, instead of the cutting pains, a curious feeling. After nine days they became so accustomed to the drug, that too large doses had to be used. These caused stomach troubles, and other medicines had to be used. The pain usually began to lessen after two doses.

In one case of sciatica there was no lessening of pain until after five doses; then the relief lasted half a day. When the salipyrin was taken towards evening, there was freedom from pain during the night. In lumbago, two doses of 15 grains, given with an hour's interval, reduced the pain so much that the patient was able to sleep again.

In one case of paralysis agitans, with neuralgic pains, 45 grains of salipyrin gave only moderate and not permanent relief. One case of supraorbital neuralgia was much relieved after six doses of 7½ grains each. In not a few cases headache was cured by 15 grains of salipyrin. This makes it noticeable that one of the most frequent drawbacks to the use of large quantities of salipyrin is the headache which sometimes follows when but a few doses have been taken.

The most disagreable results were the very frequent heartburn, belching, and nausea caused, the latter resulting in one case in six attacks of vomiting during the night. This vomiting caused by salipyrin is specially bad in the case of bedridden rheumatics, and greatly lessens its value for such cases. Few patients treated with salipyrin escaped heartburn and belching. Sometimes this could be relieved by carbonate of sodium.

Sweating was another of the frequent effects of its use, often occurring after a few small doses. In some cases the sweating was extraordinarily profuse; in others, slight, depending altogether upon the individual disposition. Curiously enough, the sweat secretion was not much increased in phthisis. Tinnitus aurium was only noted twice.

Two cases showed a resulting drug eruption.

Salipyrin appears to have no direct influence upon the action of the heart. Irregularities of the pulse, collapse, dyspnœa, were not observed even after large and frequent doses, except where the disease itself explained them, as in rheumatism complicated with heart disease. The excretion of urine remained unchanged. Abnormal elements were not usually found in the urine, or had their origin before the salipyrin was used. Salipyrin was given off in the urine twenty-five minutes after a small dose, and continued during twenty-two hours. It could not be found in either the saliva or sweat.

Salipyrin appears to Hitschmann to be a harmless, often a useful, but not, on the whole, a reliable preparation, since it only produces certain results when given in large doses, and then usually causes disagreeable sweating and stomach troubles. He does not consider that it in any way exceeds the action of its components.

THE PHYSIOLOGICAL ACTION OF EXALGINE.

After a careful study on the physiological action of exalgine, MARANDON DE MONTYEL (*La Tribune Médicale*, June 9, 1892) finds that it has little action on the digestive system, such action being limited to an increased flow of saliva and a bitter taste in the mouth, accompanied with a feeling of tightness about the stomach; and that these symptoms are absent if the drug he taken with food. The urine was decreased and the color darker than would be expected from the diminution in quantity. In sufficient doses, urobilin and indican appeared, associated with a loss of weight in the patient. Arterial tension was increased, except in a few cases where a short fall preceded the rise, always accompanied with the tightness of the stomach above noticed, and therefore probably reflex; the pulse-rate, respiration, and temperature were all lowered in patients *without* convulsive tendencies, while

these were increased in patients *with* convulsive tendencies. Vertigo, flashes of light, and ringing in the ears were present; a local or general hyperæmic or cyanotic surface, followed by paleness, sensations of cold, also local or general, with formications, were observed. It improved the intellectual and sensory disturbances of reflex origin, and aggravated the others. Its action was prompt but fugacious, the brain being the first organ affected and the first also to recover. By giving it with the meals, most of the ill effects noted were avoided.

VACCINIUM VITIS IDÆA (COWBERRY) AS AN ANTIRHEUMATIC.

The berry of the *Vaccinium vitis idæa* has long been employed in Russia, where it is known as the *brousnika*, as a condiment, and in domestic practice as an antirheumatic. From the observations of HERMANN and SMIRNOW (*La Semaine Mèdicale, Les Nouveaux Remèdes*, June 8, 1892) it would appear to possess distinct advantages as an efficient remedy in the treatment of rheumatism.

Hermann employed a decoction in a case of articular rheumatism in an old man, which had resisted all other modes of treatment, and in two months the patient was cured.

Smirnow used it in nine cases, three chronic and six acute, all of which had been treated by the salicylates, iodides, baths, etc., without success. He used a decoction of thirty to sixty grammes of the whole plant and root in one hundred and eighty cubic centimetres of water, to be taken in the twenty-four hours, with seven cures and two failures. The urine was slightly increased in all the cases. The writer advises that the treatment be continued after apparent cure, in order that relapses be prevented. Sedative local applications should be used at the same time.

THE TREATMENT OF PHYSICAL PAIN.

PROFESSOR HAYEM, in an article on this subject gives the results of some very interesting studies in this direction. He contends that to intelligently treat pain the varieties must be thoroughly understood, and, to facilitate matters, classifies pain as follows: Class 1, treated according to the intensity; Class 2, according to location; Class 3, the course of the pain, as to periodicity, duration, etc.; Class 4, the age of the case.

The intensity of the pain is of great importance when it comes to treatment, for pain can be of such severity and frequency as to cause death; for instance, pain of kidney and liver colic, and of angina pectoris. From the frequency with which certain cases have paroxysms of pain, it is evident that such remedies as chloroform and morphine cannot be constantly employed, and it is in this class of cases that the ingenuity of the physician is most severely taxed. One of the most painful affections is facial neuralgia; the remedies mostly employed are aconitine, morphine, and atropine hypodermically; antipyrin is sometimes used in the same manner. For internal medication, quinine, antifebrin, and exalgine seem to offer the best results, the quinine to be given during the interval between the paroxysms. Aconitine is the drug mostly relied upon to control the pain; when the suffering is not severe, the antifebrin and exalgine are employed with benefit. Where the neuralgia is of the trunk or extremities, some remedy must be used which acts locally, such as revulsives. One of the best remedies which the author has found is the refrigeration of the part by chlormethyl. If the condition is of the congestive form, as in recent rheumatic neuralgia, scarification is good practice. The topical application of a sedative is sometimes followed by good results. Some of the alkaloids of opium, made up in an ointment, to be rubbed over the part, often relieve pain. Veratrine, camphor, and menthol can be used in this way. In hemicrania, dependent upon bad digestion, antipyrin and phenacetin, internally administered, is often followed by relief from pain. The opium preparations alone, or in combination with cocaine, are particularly indicated in the smarting pain occurring in neuroses of the digestive tract. The so-called rheumatic neuralgia is best controlled by the internal administration of quinine and salicylate of sodium.—*Journal of Nervous and Mental Diseases*, June, 1892.

THE TREATMENT OF HEPATIC COLIC BY HOT BATHS.

CHENDRIKOWSKI reports three cases of hepatic colic treated with great success by means of hot baths. The patients had previously been treated by other doctors by all the antispasmodic medicaments usually employed under such circumstances, without result.

The author states that by means of hot compresses employed over the liver, he got

almost instantaneous relief, and that a bath at 35° C. exerts a remarkably sedative effect, the pain rapidly ceasing.

THE STERILIZATION OF WATER BY HEAT.

The very great necessity of rendering water sterile, particularly during the prevalence of infectious diseases, is becoming more and more recognized as a method of preventive treatment.

In order to meet this need there has been manufactured in France a portable boiler, with suitable containers attached, which can be taken by horse-power from house to house, providing the populace with water which has been sterilized by heat, and which will remain with its supplying-tube drawing water from the river or well which supplies the town, and deliver it to the people who bring their vessels for the daily supply. The advantages of such a method cannot be overestimated. The *Scientific American*, in its issue for July 9, 1892, publishes a picture of the apparatus, and a description which is taken from *La Nature*.

It consists of a boiler with an independent steam reservoir, one or more exchanges, and a filter. The exchanges, which are cylinders provided with worms, constitute the most interesting and original part. The impure cold water that they receive is heated by the temperature of the boiled water circulating in the return worms, and this same boiled water becomes cooled therein by giving up its heat to the water which goes to the boiler. In this way the exchange of temperature is effected without expense, and it is possible to easily furnish, on its exit from the apparatus, water sufficiently cool to be used at once.

In fact, experience has proved that water that has been submitted in this apparatus, for at least fifteen minutes, to a minimum temperature of 120° C., may make its exit therefrom with a temperature but 2° higher than that which it had when it entered. As for the micro-organisms that it contained, there no longer remains a trace of them. It is absolutely sterilized.

The method has rendered signal service in the barracks of the Marine Corps at Brest, where typhoid fever occurred for many years in such a way as to be almost epidemic.

ON THE TREATMENT OF SNAKE-BITE.

BANERJIE, in the *Lancet* for May 28, 1892, details the following cases of snake-bite which were treated at the North India Salt Revenue Hospital at Pachbadra:

CASE I.—B., a Hindoo, male, aged 30 years, a sepoy of Erinpura Irregular Force, bitten by a snake (*echis carinata*) on the dorsum of the left foot, over the site of the middle cuneiform bone. The two punctures were distinct, edges ecchymosed, and the wound bleeding. Soon after the bite was inflicted the bitten leg became heavy, a sort of low stupor crept on, and the sepoy became drowsy and felt difficulty of breathing. The part above the next joint was tightly ligatured, and the puncture cauterized with burning charcoal. All this was done before the man was brought into the hospital. The punctures were now scarified, and some blood was extracted by cupping, and internally stimulants were exhibited every fifteen minutes, and a hypodermic injection was given of a two per cent. solution of permanganate of potassium every ten minutes.

Notwithstanding this treatment, the case took a bad turn; the stupor began to deepen, so the hypodermic injection of sulphate of strychnine was preferred to the permanganate of potassium, 10 minims of which were injected every ten minutes until the quantity, amounting to one grain and a half, had been used, when twitching of the muscles of the face came on, but the stupor now began to fade away fast. The man complained of intense thirst, as if his mouth and tongue were parched, though apparently this was a delusion. Stupor soon passed off, and was replaced by hemorrhage from the mucous surfaces; even old scars of wounds began to ooze out blood. All these gradually abated, leaving the patient exhausted and weak, but he completely recovered within four days, was able to do his work, and was sent to his head-quarters.

CASE II.—S. H., a Mussulman boy, aged 12 years, while searching after some books in the hut, was bitten by an *echis carinata* on the right ankle just below the inner malleolus. This boy was brought in at 8 A.M. on August 5, 1891. A tight ligature was applied to the leg above the injury; the punctures, which were distinct, laid open; some blood drawn out; punctures cauterized; the solution of strychnine injected into both arms at intervals of ten minutes. In this case a quarter of a grain produced the required symptoms. Bleeding from the mucous membrane was slight; no stupor was present. The boy recovered on the third day, when he was discharged all right.

CASE III.—N. K., a Mussulman, aged 35 years, was bitten by an *echis carinata* on the left ankle just above the outer malleolus. He was brought into the hospital on August 9, 1891. A ligature was applied to the leg affected, the wound scarified, blood let out, and the wound cauterized. The man was in a state of semi-stupor. Ammonia mixture was given by the mouth every twenty minutes, but this apparently did not do much good. Strychnine solution was injected subcutaneously in the arms, aggregating one grain and three-quarters of strychnine, when the characteristic symptoms were produced, and the man recovered, and was discharged cured on August 12.

CASE IV.—J., a Hindoo female, aged 40, strongly built, was bitten by a *bungarus cæruleus* in the left thigh. The part round the puncture was cyanotic, and the punctures were distinct. The patient was half unconscious, but could answer questions if loudly put to her. Solution of strychnine was injected into the arms every ten minutes until twitching of the muscles of the face was observed. In all she took three grains in four days. The patient was admitted on September 3, 1891, and was discharged cured on the 7th.

CASE V.—A. B., a Hindoo lady, aged 67, was bitten by a *bungarus cæruleus* on the night of September 10, 1891, with apparently the symptoms of Case IV. The puncture was inflicted on the dorsum of the left foot and above the big toe. A hypodermic injection of solution of sulphate of strychnine was made. The patient took half a grain to produce the symptoms. On the third day she recovered, and was discharged.

CASE VI.—M., a sweeper, aged 35, male, was bitten by an *echis carinata* on the left leg just below the knee-joint. In this case a ligature was applied at once; consequently the system was not much affected by the poison. However, subsequently there was much bleeding from the mucous surfaces. Strychnine injection was tried as before, the bleeding stopped, and the man recovered, and was discharged after four days. He was brought in on September 14, 1891.

CASE VII.—R., a Hindoo, male, aged 55, stout built, a custom jemidar, was bitten on the dorsum of the right foot, just over the base of the inner cuneiform bone. The punctures were distinct, the site around was ecchymosed, and the man was in a stupor-like state. He complained of severe headache and tightness of the chest. He was brought to the hospital on March 28, 1892, at 9 P.M, one hour after the infliction of the puncture. A tight ligature was used, and blood let out from the punctures; but in this case a remedy tried by the late Dr. Dymock, of Bombay, used by him in echis-bites, was suggested by the district magistrate, and this officer supplied some herbs (*Pagostemon parvifolius*), and this herb was ordered to be chewed in from 2- to 4-drachm doses. Apparently it produced no good results, probably because the herb was dry and had lost much of its potency. So the strychnine had again to be resorted to, and the man recovered well. The leg bitten was inflamed, but soon improved under the influence of warm fomentations only. This man took four grains of sulphate of strychnine to effect a cure.

In connection with all these cases the following facts were noticed:

1. The punctures were usually well directed and deep.

2. The edges, almost without any exception, were ecchymosed.

3. Bleeding from the puncture in every case was invariably present.

4. Bleeding from the mouth, nose, and sometimes from the ears, chemosis of the conjunctivæ and urethra, and bloody urine were invariably present in many cases.

5. The blood was thin and did not coagulate; color, however, was bright, like an arterial blood.

6. Stupor and unconsciousness were not constant symptoms; some showed a tendency to them, while others had no such symptoms at all.

7. After cure had been effected, for some time the patients showed signs of irritability of temper, and were more sensitive to extremes of temperature, and occasionally epistaxis was present.

In Banerjie's hands, certainly in viperine poisoning, strychnine has proved useful, and he hopes those who have better opportunities of performing experiments will extend their investigations still further.

ON THE MANAGEMENT OF PROLAPSE OF THE IRIS AFTER SIMPLE CATARACT EXTRACTION.

W. J. CANT (*Provincial Medical Journal*, September 1, 1892) thus describes his method of procedure during the first twenty-four hours after the operation: The extraction is performed in the patient's own bed; no specu-

lum is used; the lens cavity is washed out with warm water. From twenty to twenty-four hours afterwards the eye is dressed and the upper lid raised, when, should any prolapse have occurred, however slight, the patient is put under chloroform and the prolapse excised, any tendency to adhesion of the edges being freed with the spatula. In doing the iridectomy the scissors should be held at right angles to the wound and the iris cut at one snip, when, as the conical wound has been kept open by the prolapse, the iris usually falls readily into place. No irritation is caused during the first twenty-four hours by the prolapse, but, if left much longer, the iris becomes irritated or inflamed by the healing wound compressing it. It is then much more difficult to free its edges, also the eye does not so well bear the interference. All the cases made an uninterrupted recovery.

EXTIRPATION OF A CHALAZION.

GAMA-PINTO (*Annales d'Oculistique*, April, 1892) removes an external chalazion in the following manner: After incision of the overlying skin he removes the chalazion, together with the underlying portion of the tarsus, and after this cuts through the conjunctiva. According to this method he believes that the primary healing of the cutaneous wound is more certain, because the blood is drained away into the conjunctival sac. In the same paper he refers to the fact that his examination of chalazia with reference to the presence of tubercle bacilli has been negative.—*Schmidt's Jahrbücher*, August, 1892.

THE VALUE AND INDICATIONS OF EXENTERATION OF THE OCULAR GLOBE.

M. FAGE (*Recueil d'Ophthalmologie*, August, 1892) thinks that exenteration, designed by Alfred Graefe in 1884, ought to replace enucleation in certain cases because it is easy and rapid of execution, mild in its consequences, leaves a stump qualified for prosthesis, and is effective against sympathetic accidents. The choroid ought to be detached rather than torn, for it is important not to use a sharp curette. It is advantageous to touch the internal surface lightly with a thermo-cautery, to suture the conjunctiva and drain the cavity. Exenteration in respect to the intervaginal space and Tenon's capsule should, as a general rule, be preferred to enucleation for eyes attacked by phlegmon, even in case the patient presents a dyscrasia. From a cosmetic stand-point, exenteration, leaving a large movable stump, resembles partial amputations, with the advantage that it necessarily finds more numerous applications and presents more guarantees against sympathetic ophthalmitis. However, as this ophthalmitis may be determined by the inflammation of the ciliary nerves, or by a supposed invasion of the sheaths of the optic nerve, one ought not to accept exenteration for inflamed and painful stumps, nor for eyes too much disorganized. In these cases it is proper to have recourse to enucleation.

A FEW EXPERIMENTS WITH THIERSCH'S GRAFTS IN THE OPERATION FOR PTERYGIUM.

DR. F. C. HOTZ (*Journal of the American Medical Association*, September 10, 1892) has made some experiments with skin-grafting in the treatment of pterygium. He thus describes one of his cases:

The pterygium reached to the centre of the cornea, and the sides diverged from the apex backward so rapidly that when they crossed the corneal border they included about one-fourth of the corneal circumference. The pterygium was dissected off from the cornea, and the subconjunctival fibres which bind the pterygium to the sclera, and cause the foldings of the conjunctiva, were carefully and thoroughly divided all the way back to the caruncle, so that the conjunctiva could retract and unfold itself. The retraction left a large area of the sclera (ten millimetres wide and twelve millimetres high) denuded of conjunctiva. To fill this defect a Thiersch's graft was shaved from the inside of the patient's forearm, and transported from the razor directly to the denuded sclera, and spread out smoothly over the entire wound. The graft was cut a little larger than the wound, so that when it was smoothed out over the sclera the edges of the conjunctiva overlapped the graft. The idea of tucking the edges of the graft under the conjunctiva was that the overlapping conjunctiva would assist in keeping the graft in place and protect its edges against being rolled up or wrinkled by the frictions of the eyelids on the eyeball during the latter's rotations. This part of the plan, however, did not work well, for on the next day it was found that the edges of the graft were not under but even with the conjunctiva, and

the graft reached about two millimetres over the cornea. It had evidently been pushed towards the cornea just so much as it had been tucked under the conjunctiva. On the third day, when the graft was firmly attached to the sclera, the edge which overlapped the cornea was lifted up and trimmed back even with the margin of the cornea. At first the graft had a pink color, but after the second week it was white, being covered with epidermoidal cells, which could easily be scraped off. Later on the layer of epidermoidal cells became thinner but firmer, and nine months after the operation the surface of the graft was smooth and shining, and only a very little higher than the ocular conjunctiva. It had shrunken a little more in the horizontal than in the vertical diameter, but held its place well, and formed a firm immovable bar, which made it impossible that the conjunctiva should ever again be drawn into the cornea.

Hotz has applied the same plan to two other cases of pterygium, but, profiting by the experience of his first trial, cut the grafts smaller than the defects they were intended to cover. In the second case the defect measured ten by twelve millimetres, and in the third eye six by ten millimetres. The grafts were cut eight by ten and five by eight millimetres respectively. Both took well, and though after two months their horizontal diameters were reduced from ten to six in one and from five to three in the other eye, they still serve the purpose well of holding the conjunctiva back from the cornea.*

THE PRESERVATION OF THE OCULAR GLOBE IN THE REMOVAL OF TUMORS OF THE OPTIC NERVE.

FELIX LAGRANGE (*Recueil d'Ophthalmologie*, June, 1892) has contributed an extensive article upon this subject, and thus discusses the treatment: After the diagnosis of tumor of the optic nerve has been well established, whether it be an innocent or a malignant tumor, nothing better can be done than to extirpate it. If it is a tuberculous or syphilitic affection of the nerve, surgical interference is none the less indicated, because tuberculous lesions evidently require the treatment of local tuberculosis, and a syphilitic lesion, recognized only when it is very old, is no longer curable by medical means. Nevertheless, while in doubt, energetic treatment with iodide of potassium should be tried for some time. After discussing the literature of the cases in which an attempt has been made to save the eye, and giving a description of Knapp's operation, to which he makes objection, he recapitulates the points of his own operation. These consist essentially of attacking the tumor by dividing the external rectus muscle and turning the eyeball inward. The growth is then isolated, removed, hemorrhage controlled, and the eye returned to its place and the divided tendon sutured. He admits that in most instances the eye will shrink and the cornea lose its natural glossiness, but thinks that this is preferable to an artificial eye, concluding that in all suitable instances the globe ought to be preserved if possible.

ON CERTAIN FORMS OF CHOROIDITIS AND THEIR TREATMENT BY SUBCONJUNCTIVAL INJECTIONS OF SUBLIMATE.

M. DARIER ("Congrès de la Société Française d'Ophthalmologie," abstract in the *Revue Générale d'Ophthalmologie*, June, 1892) described certain syphilitic lesions localized in the deep membranes of the eye, appearing as spots of choroido-retinitis, either in the form of little whitish spots localized in the macular region, or as large plaques invading almost the whole fundus of the eye, which are singularly obstinate to the action of mercury, but are none the less favorably affected by subconjunctival injections of sublimate.

In the discussion M. Coppez declared that this treatment by subconjunctival injections had rendered him great service.

M. Chibret stated that mercurial subconjunctival injections act more powerfully than all other means now known applicable to the disease in question. He prefers the use of injections of cyanide of mercury.

Abadie believes that subconjunctival injections of sublimate constitute in some cases a more powerful therapeutic measure than all others, and that certain patients are cured by means of them who without them would become blind. When inunctions of mercury and injections of peptonate of hydrargyrum fail, subconjunctival injections of sublimate often succeed.

Pflüger has used the trichloride of iodine in

* A brief notice of Dr. Hotz's interesting experiments appeared in the THERAPEUTIC GAZETTE, in the Detroit Letter, immediately after the meeting of the American Medical Association, in June, 1892, but their importance as a surgical procedure has been deemed sufficient to warrant this fuller abstract of the operation.

the same manner as Darier does the sublimate solution, and reports success.

Despagnet, on the other hand, fails to comprehend how a drop of sublimate solution, 1 to 1000, even if repeated, can have any definite action upon a macular choroiditis; while Vignes, who has made several of these injections, after an apparently immediate effect, found that the vision remained as defective as before the treatment.

AN ATTEMPT TO REMOVE A CHIP OF STEEL FROM THE BACKGROUND OF THE EYE UNSUCCESSFUL THROUGH AN ACCIDENT WHICH MIGHT HAVE BEEN AVOIDED.

H. KNAPP (*Archives of Ophthalmology*, July, 1892) details the following instructive case: A patient, aged 40, presented himself for treatment for a simple plastic iritis of the right eye, which gradually improved, but as two months later there was impairment of vision, an ophthalmoscopic examination was made, and a black, elongated substance was found at the upper and inner part of the fundus. The patient was told that a chip of iron was in the depth of the eye, for which nothing need be done as long as it remained quiet. The eye remained free from irritation for about four months, and then the sight became impaired from detachment of the retina, and the patient was advised that an attempt should be made to remove the foreign body without enucleating the eye, but that in the event of failure the globe should be sacrificed.

The operation was as follows: Under cocaine the tendon of the internal rectus was exposed, and a suture placed through its upper edge in the upper part of the episclera, near the corneal margin, and another suture in like manner through the lower edge of the tendon. Both threads were left untied, so as to draw the muscle forward again at the end of the operation. The tendon was detached from its insertion, and it, as well as the muscle and adjacent episcleral tissue, was dissected off as far as the entrance of the optic nerve into the sclerotic. The posterior half of the ball was then drawn forward by means of a sharp, double hook, a small, squint hook was passed around the optic nerve, and the sclera incised with a Beer's knife in the horizontal meridian from the optic nerve, slightly nasally and upward. A drop of vitreous presented. It was now proposed to draw the foreign body into the wound with an electromagnet, seize it with forceps, and cut it out of its connections. The magnet, which had been found in good order before the operation, did not work, and by examining the wires and their connections, shaking the battery, etc., it was impossible to ascertain where the current was broken. Not being able to use the magnet, Knapp tried to extract the supposed foreign body with forceps, but brought out only vitreous and shreds of soft, pigmented tissue. Not succeeding in taking hold of the foreign body, and thinking that further attempts, even if successful, would destroy the eye and possibly endanger the other by sympathetic irritation, the globe was enucleated. The enucleated eye was opened by an equatorial section, and it was found that a black, metallic body lay close by the incision which had been made into the sclerotic. It was attracted and raised with the surrounding tissue by the electro-magnet, which now worked very well. The commutator had been moved inadvertently, which caused the interruption of the current, but had not been noticed during the operation.

Commenting upon this case, Knapp writes as follows: "The experience thus gained shows that the plan of the operation was judicious and the execution correct. The result in all probability would have been satisfactory had the disturbance of the battery not occurred or been detected during the operation. The method of the operation is the same according to which tumors of the optic nerve have been removed, with preservation of the eyeball, the sheath of the optic nerve incised, and cysticerci extracted from the posterior part of the retina. That it may be successfully applied to the removal of foreign bodies from the posterior segments of the globe seems proven by the above case."

TREATMENT OF DETACHMENT OF THE RETINA.

M. CHEVALLEREAU ("Congrès de la Société Française d'Ophthalmologie," abstract in the *Revue Générale d'Ophthalmologie*, June, 1892) declares that an excellent treatment of detachment of the retina consists in the application of the points of a fine galvano-cautery to the level of the detachment, with the object of causing revulsion and producing an adhesive choroiditis. This process has often given him noteworthy results and never any aggravations.

De Wecker speaks in favor of this as a

most effective treatment, believing that it is less dangerous than intraocular injections. However, the fine point of the thermo-cautery, which chills less quickly, is preferable to the galvano cautery.

TOXICOLOGY OF MALE FERN, WITH SPECIAL REFERENCE TO VISUAL DISTURBANCES.

Drs. Katayama and I. Okamoto (*Sei I-Kwai Medical Journal*, June and July, 1892) contribute an article concerning the toxicology of male fern and its effect upon acuity of vision, which is based upon a review of the literature and a series of experiments made upon dogs. The following conclusions are drawn:

1. The extract of male fern has a toxic property, and it acts principally upon the digestive system and the nerve-centres, producing such symptoms as vomiting, diarrhœa, colic, cephalalgia, difficulty of locomotion, dilatation of the pupil, impaired vision, hurried respiration, motor paralysis, depression, etc.

2. The main reason why more reports than formerly on poisoning by the extract of male fern are seen depends upon the fact that in recent years the dose of the medicine has been increased considerably. As the quality of the medicine varies according to the habitat of the crude drug, and according to the degree of freshness of the preparation and the like, the fatal dose cannot well be determined. In general, however, when a large quantity is given, there invariably appears an almost constant series of symptoms.

3. It is true that after the use of the extract of male fern loss of vision sometimes appears, but it is not constant; only under certain conditions does it make its appearance.

4. Loss of vision is one of the symptoms of poisoning by the extract of male fern, and it is a matter of course that it may appear along with the other symptoms. However, it does not seem to be necessarily contingent upon the size of the dose and the mode of administration.

5. In looking over the various reports, it is evident that patients who had failure of vision, consequent upon the use of the extract of male fern, were all persons of poor health. The dogs which became blind were also young and weak, and, in general, amblyopia or amaurosis from tobacco-poisoning is common in people of enfeebled constitution. From this it is inferred that the liability to amblyopia, after the use of the medicine, exists mostly in people of poor health. Persons of feeble health do not have this liability alike, but some of them are particularly susceptible to the toxic action of the drug.

6. Such being the facts, therapeutists or practitioners of medicine would perhaps do well to note the following points: *a*. The extract of male fern should be prescribed in small doses. *b*. Extract of male fern is readily absorbed when given mixed with oil; even without oil it is absorbed when it remains long in the alimentary canal. *c*. After the extract of male fern, castor oil should not be given. Some other cathartic is indicated. *d*. When the extract of male fern is used, it is wise to be on the alert for such symptoms as headache, amblyopia, etc. As soon as the slightest indications of these appear, the further use of the medicine should be stopped.

EXCISION OF THE DRUM MEMBRANE AND OSSICLES FOR THE CURE OF OTORRHŒA.

An important paper on this matter, which has been rather ardently discussed of late, is compiled by Grunert from the public and private practice of Schwartze, in Halle, and published in the *Archiv für Ohrenheilkunde* for July. The impression among some Americans that this operation belongs rather to this side of the Atlantic, hardly needs combating, for several European workers have done it oftener, as well as much earlier, than the combined otologists of America; but this experience of Schwartze ought to be better known, and is so huge that it can almost stand alone in deciding the questions as to the procedure. To the 75 cases of March, 1889, to September, 1890, published by Ludewig, Grunert adds 76 cases operated on up to December, 1891,—a series of 151 operations in some thirty odd months. He reviews the statistics of Ludewig, excluding the atypical cases, such as 19 in which the mastoid antrum was also chiselled open and 3 in which the extraction of the incus failed, and giving the further history of all accessible patients. Of the 43 cases thus followed, 19 remained unhealed, 24 were cured, and 4, not heard from, were healed at the last note Of the 28 typical cases of the later series, 13 were healed, 13 unhealed, and 2 still under treatment,—figures that further observation may alter, of course. Among these 71 operated cases, then, some 41, or 58 per cent., may be claimed as cured (he gives 51 per

cent., with 46 per cent. failures). This is a good showing, when coupled with immunity from bad results, although the gain in hearing was rarely notable. The eager but inexperienced worker in this field will find instructive reading as to the 19 cases in which the mastoid had to be trephined in the usual way, and the 29 in which it was opened from the canal after Stacke's method; still more as to the 18 cases in which Schwartze found himself unable to extract the incus, and 3 in which he was able to remove neither ossicle. Evidently the operation is not very easy, even in very expert hands. Learning that the failures showed results almost better than the more ideal malleo-incudal excisions, he may ponder with profit as to the real indications for operation, and may practise meanwhile the less radical measures of enlarging perforations that are too small, syringing and packing the carious attic, and giving the slow but discriminating hand of nature a chance to remove the useless, yet perhaps harmless, portions of the organ, which have been damaged by the suppurative process. It is fair to question if the excision in several hundred cases actually calling for it will give nearly as good a showing in the perfection, promptness, and durability of cure as a similarly observed series subjected conscientiously to the more conservative methods.

A NEW TREATMENT FOR TYMPANIC OTALGIA.

Under this head, in the *Wiener Med. Wochenschrift* of July 30, EMANUEL MAX, of Vienna, touches upon the general subject of neuralgias and their treatment, and some of the newer means which have been successfully employed to reduce the proportion of intractable cases. In some instances of the otalgia of the latter type, in which naso-tubal and dental treatment, medicines, electricity, massage, and hypnotism had proven alike impotent or fleeting in effect, he found great benefit from the form of massage by means of pressure with an elastic probe, advised by Lucae for the treatment of sclerotic deafness. Such an instrument, with a head "dimpled" for the reception of the short process, is placed against this portion of the malleus, and five to ten rapidly executed pressure movements made with gentle force. Pain is usually caused or increased, but soon yields spontaneously, to recur rarely, if at all, afterwards. If further experience shall bear out his earlier observations, a measure of real value may thus be found for some very trying and intractable cases.

EXPLORATORY PUNCTURE AND LAVAGE OF HIGHMORE'S ANTRUM.

In the *Revue de Laryngologie, d'Otologie, et de Rhinologie* of August 15, O. CHIARI, of Vienna, compares the value in his own practice of the various procedures for studying and treating empyema of the maxillary sinus, with a decided commendation, for diagnostic purposes at least, of the "exploratory lavage" of Lichtwitz, previously discussed in these columns. The difficulties and failures of each method before tried, and the superiority in facility, freedom from pain and danger, and the sureness in most cases of discovering pus by this irrigation, if it be at all present, mark it as best for diagnostic and often for therapeutic purposes. Whereas irrigation through the natural passage succeeded but once in twenty-seven cases, and puncture and aspiration by Schmidt's method failed six times in twelve, he succeeded in five out of six cases in executing satisfactorily the lavage of Lichtwitz by puncture of the median wall of the inferior nasal meatus with a fine trochar. As the bony wall in one of these, as also in some other cases, resisted penetration by the oblique attack of the straight instrument, he expects to find a curved canula better in the future, as have others, like Jurasz, who claims distinct advantage for his double canula.

THE TREATMENT OF CANCERS OF THE SKIN.

ROBINSON (*International Journal of Surgery*, vol. x., No. 7), after a careful study of the method of extension of cutaneous epitheliomata, discusses the comparative merits of the knife and of caustics in accomplishing permanent cure. As far as the cutting operation is concerned it is, of course, clear that, if the surgeon makes his incision beyond the limit of infiltration, there can be no recurrence of the disease. In the case of mammary cancer, by means of the knife it is possible at a single operation, and without pain or special danger, to remove a mass of tissue which could not be removed by other methods without much suffering lasting for considerable periods. If the growth is a recent one, and the operation is performed with due regard to the possible extent of the infiltration, an excellent result is to be expected. It is unfortunately true, how

ever, that even in cases of not very advanced cancer, probably from want of belief in the likelihood of distant slight infiltration, the parts appearing macroscopically healthy, a recurrence takes place either from the base or along the scar-margin within a few months, time. In these cases there is a great tendency for infiltration to pass into the pectoral fascia and between the muscle-bundles, and also towards the cutaneous surface in the area of the nipple, and the operator should cut as wide of the nipple as is consistent with the bringing together of the flaps, and should also remove as much as is permissible of the deep parts, as well as of the fat-tissue outside the gland. Under these circumstances, and when the operation is performed early, it is quite certain that recurrences would be rarer than at present.

When the axillary glands are affected, not only should these glands be shelled out, but peri-glandular tissue also should be removed or cauterized, and as much tissue as possible should be removed in the area through which runs the lymphatic channels between the primary and secondary tumors; for not to remove that could have but one result,—a recurrence of the growth. Whether after the operation the parts should be treated antiseptically, in order to obtain if possible healing by first intention, is a question which may be considered still *sub judice*. Where it is reasonably certain that the knife has been carried wide of any possible infiltration, prompt healing is in every way desirable. Where, however, it is understood that infiltrated foci remain at or near the cut, it is possible that the marked inflammatory reaction incident to suppuration or to the use of powerful caustics would have a tendency to destroy such foci, as they offer less resistance to inflammation than the healthy tissues.

There are some parts of the body subject to cancer where the knife seems to offer the greatest hope of cure. Thus an epithelioma sometimes develops upon the flexor surface of the forearm near the wrist, probably indirectly caused by the irritation from a shirt-sleeve button. Unless seen very early, these cases are difficult to handle with caustics, and, as a rule, amputation of the arm above the elbow is probably the best method of treatment.

Cancer of the penis, if advanced, should also be subject to the same treatment. Epithelioma of the scrotum—a part from which it is usually possible to remove a large amount of tissue without injury to the patient—will also give best results from the use of a knife.

On those parts of the skin where the general surface is flat, as on the forehead, prominent part of the cheek, lips, and back or front of the neck, it is not difficult to remove a considerable area of skin without producing deformity, hence the cutting operation may be undertaken. On other parts, however, as when cancer is situated upon the nose, and especially upon the alæ,—a frequent situation,—it is not possible, as a rule, to remove the necessary amount of tissue without causing more or less mutilation. And if the disease can be removed equally well by other means which do not cause noticeable deformity, the knife should not be used.

Having decided to operate with the knife, and the incision having been carried wide of the disease, the base and margins of the wound should be touched with caustic potash, thus encouraging an acute inflammation which would destroy any remaining cells. The parts are then brought together, and healing encouraged by whatever means seems advisable.

The advantages of excision are: No pain, quick removal of the tumor, and rapid healing of the wound. But to accomplish as much as can be done by caustics and the knife combined, more tissue must be removed than when only one of these means is employed.

The use of electricity as a caustic has been shown not to be a reliable agent. With a galvano-cautery or a thermo-cautery, the tissues can be destroyed as well as with chemical agents, and without pain if cocaine be first injected. There are parts of the body where the method is sometimes advisable, as when the tumor is situated in the roof of the mouth, or close to the inner or outer canthus of the eye. It is not suitable for large or deeply seated tumors; and as it destroys equally normal and pathological tissues, it is followed by more scarring than after the use of certain caustics. If it is used, the tumor mass should be thoroughly destroyed at a single operation, or if this is not practicable, the subsequent operation should not be delayed many days, lest the parts get into the condition of reaction after injury, one peculiarly favorable for the growth of any remaining malignant cells.

Scraping or curetting, combined with the use of caustics, should not be employed upon any but very superficial tumors.

The use of certain caustic agents, judiciously and properly applied, is of the greatest service in the treatment of cutaneous cancers, and, in the majority of cases, far superior to the knife in securing their permanent removal, with the

least amount of deformity. It is clear that no caustic should be used that does not rapidly and immediately destroy the epitheliomatous tissue.

The three agents which are quoted by the author as of most service are caustic potash, chloride of zinc, and arsenious acid.

Caustic potash quickly liquefies tissue, and with this agent one can at a single sitting destroy a large amount of cancerous infiltration. The action of the caustic extends farther than the part directly necrosed, and its use is followed by marked inflammatory changes in the surrounding parts. If it is so applied that a cancerous nodule is entirely destroyed, an intense inflammatory process is set up for some distance around the seat of direct application. This latter may or may not lead to destruction of tissue, as extensive as would have resulted were the cancer extirpated, the knife being carried at what is considered a safe distance from the tumor. If destruction of tissue is as extensive as this, there is an additional area of intense inflammation, extending to the surrounding tissues and destroying epitheliomatous cells, if such exist, which would have been spared had the cutting operation been performed. The degree of intensity of inflammation must, however, be considerable to destroy the morbid tissue. As the degree of inflammation will depend upon the vulnerability of the tissue, and the vulnerability upon the condition of nutrition, this condition depending upon the extent of the infiltration by the epithelial cells, and, as it has been already noted that a circulatory disturbance is always present in cases where the epithelium has penetrated the connective tissue, so the amount of inflammation following the use of the caustic is a valuable guide as to the extent and amount of the epithelial infiltration. If extensive sloughing develops subsequent to the direct application, and the surrounding tissues break down completely, it is because the cancerous infiltration is considerable in that part of the tissue which is consequently very vulnerable. Hence it seems clear that in epitheliomatous tumors during the earlier stages, and even when they are of considerable size, the application of caustic potash will accomplish much better results as regards complete removal of the disease than can be obtained with the knife, provided the same area of tissue is destroyed or removed in both operations.

In addition to the caustic action, from the use of the caustics there is formed in the tissues cauterized a toxalbumin, which is destructive to the cancer cells or organisms, if such exist. Perhaps it is the inflammatory process alone which gives such good results in the primary tumor; but when large lymph-glands, at a distance from this tumor, diminish in size after the cauterization, it is difficult to avoid the view that such an agent must be acting.

Caustic potash is advised in all cases of small tumor upon the cheek, lips, and some other parts of the body; but it is unsuited for employment near the eye and upon the alæ of the nose, and when the tumor is near an important blood-vessel. The objection to the caustic potash is that it destroys pathological and normal tissue about equally. Its use is attended with much pain.

Chloride of zinc can be used either in stick form or in solution, or in a paste. It does not destroy tissue so rapidly as caustic potash, and it causes much more pain, which lasts for a longer period. It destroys both normal and pathological tissue, although not with an equal degree of rapidity. In all cases mentioned as suitable for the use of the potash, the zinc can also be employed; and, in the stick form, on account of its slower deliquescence and the ability to use it as a pointed pencil or arrow, it is much to be preferred in some cases.

While it is not advisable to treat a primary cancer of the mammary gland by Maisoneuve's method of arrows introduced through punctures, yet there is no reason why the method should not be successful, and in recurrence the use of the stick form enables one to destroy, with considerable precision, deeply-seated masses of morbid tissue. In epithelioma of the roof of the mouth and that of the lip, the stick can be used with good results. In those cancers of the lip with a tendency to the nodular form of tumor, the stick can be pushed to the base, and the part cauterized to any desired extent, or a piece of the zinc can be embedded at the base and allowed to dissolve, the size of the piece depending upon the amount of the necrosis desired. The stick is also used to cauterize the base of cutaneous epitheliomata removed by the knife or curette, and the wound left after removal of the mammary gland by excision. When the epithelioma is situated near the outer or inner canthus of the eye, or even when the lid is attacked, a pointed stick can be used very effectively and safely.

A chloride of zinc paste is one of the best means we possess in the treatment of cutaneous epithelioma, and has also been strongly recommended for mammary cancer. The formula usually employed is that known as Bougard's paste, and is as follows:

℞ Farinæ triticl (wheat flour),
Amyli, aa ℥i;
Acid. arsenios. pulv., gr. viii;
Hydrarg. sulph. rub., ℈ii;
Ammon. mur., ℈ii;
Hydrarg. bichlor. corros., gr. iv;
Zinci chlorid. cryst., ℥i;
Aquæ fervid., ℥iss.

The first six substances are finely ground, and then mixed in a glass mortar. The chloride of zinc is dissolved in the boiling water, and this solution slowly added to the powder, the contents of the mortar being kept rapidly moving with the pestle until all the solution is added; then it is allowed to stand for about twenty-four hours, and the paste is ready for use. It is spread thickly upon a piece of muslin. If the application has been successful, all of the macroscopical mass will appear necrosed completely and the tissue beyond inflamed, as after the use of caustic potash. As the paste does not act as quickly as the potash,—in other words, as the tissue is able to resist its injurious action for a much longer period than is the case with the other agent, and as the pathological tissue succumbs easier than normal tissue,—it is possible to remove an epithelioma by means of the paste with less deformity than by caustic potash. It is therefore the preferable agent if the epithelioma already occupies a considerable area.

If the first application is not successful, the second application should be made within a few days. A large surface can be treated in a single sitting with this paste, as there is no danger of poisoning. If the infected area is already very large, it is advisable to destroy first that part encroaching on important organs, and subsequently apply the paste to the remaining part. This paste can be used in all the forms of cutaneous epithelioma; but the stick of zinc is preferable for some locations.

The only objections to the paste are the great pain it causes, more than caustic potash and much more than arsenious paste, and also that it is not as elective in its action as arsenious acid or pyrogallic acid. It is a good application for the papillomatous form of epithelioma, but in the distinctly epithelial form—a flat epithelioma, for instance—an arsenious acid paste is more satisfactory. If the epidermis over the tumor has not broken down, it is better to liquefy it with caustic potash before applying the paste. When it is evident that sufficient tissue has been destroyed, the resulting sore may be treated by a simple indifferent protective salve, or by an antiseptic dressing. If loss of the tissue is considerable, it is better to have the sore heal slowly, so as to have granulation tissue formed, in order that the resulting deformity be as slight as possible.

Robinson holds that there can be no question among those who have treated many cases of cutaneous epithelioma that the use of Bougard's paste is a decided advance over the use of the knife, with the few exceptions, as regards locality, mentioned when discussing the cutting operation. The resulting scar in small tumors is unappreciable, and even when a large area is affected the deformity after cure is not great. The great advantage, however, is that, if well treated, the disease is not liable to return.

With arsenious acid, in the form of Marsden's paste, the author has had his best results. This paste consists of equal parts of arsenious acid and powdered acacia, rubbed well together, and enough water added to make a paste about the consistence of butter. It must be freshly made each time it is used. It is spread upon muslin or rubber plaster in a layer about one-quarter of an inch thick, and firmly applied to the part. Marsden advises that it should not be applied at one time to a larger area than one square inch, but the author has applied it to very much larger surfaces, and has never seen any injurious effects. It is not suitable for cancer of the lip or of mucous membranes, on account of the danger of poisoning by absorption.

If the epidermis is unbroken, it should be partly destroyed with caustic potash to get the prompt action of the application. The paste is spread upon rubber plaster and fixed to the part. It should always, when possible, cover a surface extending half an inch beyond the elevated margin of the tumor, and should be left on from fourteen to twenty hours. Within twenty hours there is no danger of the acid destroying the surrounding normal skin. Sixteen to eighteen hours is the proper time to advise the patient to apply it. It is probable that the action of arsenic is elective in character,—that is, the caustic has a preference for the epitheliomatous tissue apart from its simple pathological character; hence it is apparent that the paste would destroy the outlying epithelioma, while the original tissue would be scarcely injured by the inflammatory process. That such elective action does exist is shown by the difference in effect between chloride of zinc and the arsenious acid paste. The effect of the arsenious acid paste is the same in sixteen to eighteen hours as the chloride of zinc paste in twenty-four hours; but the injury to the normal tissue is greater with the latter than with the former, conse-

quently the Marsden's paste has a tendency to destroy the pathological tissue in a special manner in addition to the action of a non-elective injurious agent, which destroys pathological tissue sooner than normal.

If after removal of the paste, the part does not run the course of a simple wound, two, or even three, applications should be made. The object is to secure prompt and sufficient action and healing equally from all parts of the margin; but if it refuses to heal at any one part, the paste should be reapplied to that portion, for in that case it is certain that some of the tumor still exists. If the wound heals quickly and from all parts, the patient should be kept under observation for at least one year, lest a recurrence take place, as the presence of a few isolated cancer cells would not interfere with the process of repair.

If the cancer returns, the same treatment must be again employed; but if the paste has acted to the desired extent, recurrences are not frequent. Where it is desirable to save as much tissue as possible, the arsenious acid paste is to be preferred in all cases. Upon the nose, for instance, the author has frequently removed an epithelioma the size of a finger-nail without causing any appreciable loss of the normal tissue. From its action so far beyond the area of complete necrosis, parts can be treated that are sometimes scarcely accessible to the knife, and on this account the final results of the treatment as regards recurrences compare most favorably with the operation by excision.

A frequent fault in the use of these caustics is the neglect of physicians to treat the case energetically until they are thoroughly satisfied that enough tissue has been destroyed. The desire not to give too much pain is usually the cause of this imperfect treatment.

Pyrogallic acid, one drachm to one ounce of vaseline, applied continuously for two to seven days, acts somewhat like arsenic,—in an elective manner,—and causes little, if any, pain. It is a suitable application for extensive peri-epitheliomatous lesions after curetting.

Resorcin and salicylic acid sometimes act well, but are unreliable.

Pyoktanin and fuchsin have been found wanting, as compared with the means already discussed.

With the three caustics, and with the knife in proper cases, a favorable prognosis can usually be given in all cases of cutaneous cancers seen early, and in many cases of recent mammary cancers. Caustics will also at times cure cases declared unsuitable for operation by the knife.

AN EFFICIENT METHOD OF CONTROLLING HEMORRHAGE AFTER SUPRAPUBIC PROSTATECTOMY.

KEYES (*Medical Record*, vol. xlii., No. 12), after commenting upon the free bleeding sometimes attendant upon prostatectomy, bleeding which is not always checked by the means ordinarily employed, describes a plug which he has used to his own satisfaction. This plug is made of bichloride gauze. A square of four thicknesses of gauze is first cut, the length of each side being about six inches; upon this are placed eight thicknesses of gauze cut square, each side measuring four inches, and upon this eight other thicknesses of gauze, also square, the side measuring three inches; centrally upon the three-inch pad a small shirt-button is tied by stout silk ligatures, transfixing the pad, and tied upon the six-inch square surface. This central button also has a piece of silk attached to it, running out freely in the direction away from the three-inch surface. This is to facilitate extraction. Each of the corners of the six-inch pad is tied with a piece of silk, and the silk from each of these four corners is knotted at its end into a double knot, while the silk running out backward from the button is tied with a single knot, for the purpose of distinguishing which is which when making the extraction; although practically it will be found that they must all be made taut and pulled upon altogether, in order to effect removal with the greatest ease.

The double silk is secured to the end of a soft catheter passed through the urethra after the suprapubic opening has been made. On withdrawing the catheter the silk is drawn out through the urethra. By traction the tampon can be drawn powerfully down into the funnel-shaped excavation of the prostate, and can be kept in place by tying the double ligature over a piece of soft gauze at the urinary meatus upon the relaxed penis. Or perineal urethrotomy may be made and traction exerted through this opening, thus holding the tampon firmly in place.

Cabot, in a communication to Keyes, suggested a form of tampon which he believes would be much easier to remove. This consists of a long strip of gauze, the edges of which are rolled in and stitched, so that there may be no loose frayed threads. This strip is then doubled upon itself, forming a tent-shaped plug, at the smaller end of which is placed the button, while the silk to which it is attached passes through the centre of the folds. By drawing on this thread, the whole

plug would be evenly drawn into the cavity left by the extirpation of the prostate. For the purpose of facilitating the removal, another thread is attached to the extremity of the bandage which forms the apex of the plug. Tension upon the button having been removed, by drawing upon the upper thread the whole strip can be taken out very much as when ordinary packing is employed.

CALOMEL INUNCTIONS IN SYPHILIS.

BOVERO (*Giorn. Ital. delle Mal. Ven. e della Pelle*, fasc. i., 1892, and *Monatshefte für Praktische Dermatologie*, Bd. xv., 1892) has treated one hundred and eighty syphilitics by means of calomel inunctions.

The ointment is made as follows:

℞ Sublimated calomel, 5 to 10 parts;
Lanolin, 30 parts;
Coca butter, 100 parts.

Inunctions are made precisely as in the case of gray ointment. Each should last for from twenty to twenty-five minutes. Different areas of the body are selected from day to day, so that an interval of from five to seven days shall elapse between two rubbings in the same locality.

In the treatment five to seven rubbings are given. Then there is an interval of two or more weeks, during which iodide of potassium is administered internally, from 8 to 25 grains a day. Then another interval is allowed and the inunctions are resumed. The whole treatment lasts for five or six weeks.

Bovero has noticed but a single recidivity. Stomatitis occurred in five cases, these being patients either with defective teeth or those addicted to tobacco and alcohol. Anæmic and cachectic patients were not subjected to the treatment immediately, but were first given a strong tonic treatment.

This means of treatment, according to the author, possesses the advantage of cleanliness as compared to gray ointment, is seldom followed by stomatitis, does not cause local inflammations of the skin, and is efficient.

TREATMENT OF SYPHILIS BY INJECTION OF LAMB'S BLOOD.

TOMMASOLI (*Gazz. degli Ospitali*, No. 28, 1892, and *Monatshefte für Praktische Dermatologie*, Bd. xv., 1892) injected six patients suffering from secondary syphilis with serum obtained from the blood of lambs. In obtaining this fluid the blood was allowed to stand on ice for twenty-four hours. It was then sterilized, and injected in quantities of from 2 to 8 cubic centimetres in the region of the nates. About sixty-four injections were given, these being continued after the disappearance of all specific symptoms. Locally some of the patients suffered from painful indurations and erysipeloid erythema and from slight transient fever. As to the therapeutic results, Tommasoli states that he knows of no other treatment which causes so rapid a disappearance of syphilitic manifestations.

These observations need the confirmation of other observers. If they are reliable, they point strongly to the possibility of obtaining immunity upon the part of non-infected men by prophylactic injections.

Reviews.

A NEW PRONOUNCING DICTIONARY OF MEDICINE. By John M. Keating, M.D., LL.D., and Henry Hamilton.
Philadelphia: W. B. Saunders, 1892.

There was a time in the medical history of the United States when Dunglison's celebrated dictionary served as the only distinctly medical dictionary to which the physician might turn when in search for a definition of any term which might be unfamiliar to him. Following this period, Dunglison's dictionary passed into a condition in which it was anything but up to the requirements of the last decade. As a result of this lack of competency, publishers soon felt the necessity of better works. As a result of this, within the last few years the dictionaries of Billings, Gould, Foster, and Keating have been placed before the profession. Each of the books seems to possess advantages which the other lacks.

Foster's dictionary is so large that it is not easy to turn to it for ready reference, although we believe that it is the dictionary of dictionaries. Keating and Hamilton's dictionary, which we have before us, is certainly a valuable addition to medical literature, and promises to obtain a place in the library of the physician who desires to have his shelves filled with that which is best in medical book-making.

While it is only by the use of a dictionary month by month that its weak points are developed, we have been favorably impressed during the last few weeks by this book, except

in regard to a number of points which future editions may remedy. Points which if not remedied will leaven the good so seriously as to ruin the book. The size of the type used, not only for the terms themselves, but also that of the definitions, is particularly good, and the leading is so heavy that the eye is not strained in reading its pages. We also note one great advantage which this dictionary has over most other dictionaries which endeavor to be complete, and at the same time to occupy a small space, —namely, that the definitions are complete enough to afford the reader distinct information in regard to the word without his being referred to a number of other words. We can perhaps illustrate this best by pointing out that single synonymous terms are often largely employed for definitions; as, for example, "invagination" is spoken of as "intussusception," and "intussusception" as "invagination," very little, if any, more information being given. This book avoids this error and gives complete information.

Looking over the pages of the book, we find that its authors have failed to insert a number of terms which are frequently used in discussing conditions of the eye. Among others the words "heterophoria," "esophoria," and "exophoria" are not included. The term "antihydrotic" is not given, perhaps because the authors believe it is not a good word. While the word intussusception is given, we have no definition for intussusceptum and intussuscipiens, terms commonly used by physicians in discussing the subject of intestinal disease. Psychophore is spelt "psychophone," and "liquor carbonis detergens" is not included.

At the end of the book is an appendix containing comparative tables of weights and measures; the diameters of the female pelvis and fœtal head; a table of cardiac murmurs; another of the cranial nerves; and a third of the localization of the functions of the segments of the spinal cord. This is followed by a table of ptomaïnes and leucomaïnes; by another containing the number of drops of different liquids required to make a fluidrachm; a dose table; a list of incompatibles, arranged in tabular form; and a list of the newer remedies, arranged in a similar manner, which has been contributed by Dr. David Cerna.

A by no means useless addition to the book is a list of diseases which are called by proper names in different portions of the world. These names should have been included in the main portion of the work. The formulæ of solutions in common use, and drugs and materials used in antiseptic surgery, complete the book.

ELECTRO-THERAPEUTICS OF GYNÆCOLOGY. By Augustin H. Goelet, M.D. Nos. I. and II. Illustrated. Detroit, Mich.: G. S. Davis, 1892.

These two volumes are numbers of the so-called "Physician's Leisure Library" series, which are becoming so well known to the practising physician.

To those who believe in the electro-therapeutics of gynæcology, or who want to give it a fair trial, this little work of Dr. Goelet's will prove a most useful book, for it is copiously illustrated, and the illustrations are unusually clear. Further than this, it offers the most convenient, lucid, and accurate account of modern gynæcological electro-therapeutics, which is a matter so thoroughly before the profession at present that each one of us should study it in order to determine for himself the exact position which electro-therapeutics must ultimately take in the treatment of the diseases of women. Of course, Dr. Goelet, being an enthusiast in this method, believes that electricity will do much more for his patients than do most of the profession, yet it is but fair to state that he is unusually just and temperate in his statements.

Whether those who read the book resort to these methods or not, they will find many sentences which will clearly show them that measures other than those which are operative are of advantage in producing a cure.

At the end of the second volume an interesting nomenclature for records of treatment is given, and the author recommends that a different colored ink, or a different colored pencil, be employed to make notes in the case-book, when the negative or positive electrodes are employed.

A list of the electrodes necessary for gynæcological work is also appended.

HOW TO FEEL THE PULSE, AND WHAT TO FEEL IN IT. By William Ewart, M.F.R.C.P. New York: Wm. Wood & Co., 1892.

This is an interesting little work, well illustrated, and suitable for the student and graduate.

The indications which the pulse gives us can only be learned by experience and by the practice of the tactile sense involved when the pulse is felt. Notwithstanding this fact, Dr. Ewart's book will do much towards giving definite information as to what one is to look for when studying the indications of

the pulse, and it will do much towards attracting attention to one of the points in diagnosis which is in many cases resorted to too little. Much that is said in this book may be found in those works which are devoted to the teaching of physiology, physical diagnosis, or the practice of medicine, but in each of these cases other information contained between these covers is not included.

THE DISEASES OF WOMEN. A MANUAL OF NON-SURGICAL GYNÆCOLOGY, FOR STUDENTS AND GENERAL PRACTITIONERS. By F. H. Davenport, M.D. Second edition. Revised and enlarged. Illustrated.
Philadelphia: Lea Brothers & Co., 1892.

The first edition of Dr. Davenport's book, which was published three years ago, evidently met with the reception it deserved, or the second edition would not have followed so soon. The title is an attractive one, and the contents are of value to the student and general practitioner. To those who are familiar with the book of Halliday Croom, this book will appear to be an advanced edition of that work. One advantage of it is that it teaches the physician or the student how to do the little things, or to remedy the minor evils in connection with gynæcology. In these days when major gynæcology is so largely practised, minor gynæcology is too frequently ignored.

To those in the profession who are about to interest themselves particularly in this branch of surgery, and to the student who intends in the future to make gynæcology his life-work, we believe that Davenport's book will be essential to his success, because it will teach him facts which larger works sometimes ignore.

A TEXT-BOOK ON THE PRINCIPLES AND PRACTICE OF MEDICINE. FOR THE USE OF STUDENTS AND PRACTITIONERS OF MEDICINE. By Henry M. Lyman, A.M., M.D. Illustrated.
Philadelphia: Lea Brothers & Co., 1892.

When the reviewer has placed in his hands a work such as that of Dr. Lyman, he naturally endeavors, by scanning the text and preface, to discover the why and wherefore of its existence, in view of the large number of similar works by standard authors which are already on the market. After a careful examination of Dr. Lyman's book, we confess to be unable to discover that there are any particular reasons for its existence, except that the author desired that the students whom he taught should have a work written by himself, even although it embodied no new ideas either in method of construction or in medical fact. It is true that in the arrangement of the chapters the author has deviated from the time-honored order of sequence, and he points out that, as many of the diseases of the external surface of the body are parasitic, it seems best to continue immediately with the investigation of parasitic diseases involving the internal organs. This leads to the consideration of infective diseases, and finally to those of the blood and the organs of circulation.

We do not quite understand why "the medicinal agents and the doses which are set forth are usually those which are the most generally applicable in hospital practice, and in treating the majority of patients." Assuredly most of those who will buy this book would purchase it rather for the study of disease by the private bedside than in a hospital, and hospital treatment in many instances varies so greatly from that employed in private practice that the methods used in the hospital should not take precedence of the others.

This statement in the preface directs particular attention to the statements which are made in regard to the treatment of disease. As a general rule the articles upon treatment are far too brief, and in most instances are either unsatisfactory, because of brevity or because only one particular line of treatment, not universally acknowledged as the best, is the only one given. Thus, in the treatment of diphtheria, the statements made are neither full nor are the directions particularly useful. The statement that paralysis agitans is a disease of old age is not exactly correct, for many men who by no means have reached the period of old age suffer from it. Not only is this true, but the picture which is given to illustrate a patient suffering from paralysis agitans is not that of an old man.

Notwithstanding these facts, the book contains practically all the information which is usually found in text-books on the practice of medicine. It is much better than some of those which are upon the market, but is certainly not as good as are the works of Osler or Bristowe.

Taking it all in all, it contains so few errors as to be unobjectionable, and at the same time presents so little reason for its existence as to make one wonder why it was written. Nevertheless, he who buys it will buy a good book, and will perhaps be better served by it than if he purchased another more original in its ideas.

DISEASES OF THE STOMACH. By C. A. Ewald. Authorized translation from the second German edition. With special additions by the author. Translated by Morris Manges, M.D.
New York: D. Appleton & Co., 1892.

During the last five years the study of diseases of the stomach upon rational lines has advanced with wonderful rapidity, and no one has been more forward in the effort to place the diagnosis and treatment of gastric disorders upon this rational basis than Dr. Ewald.

It is too true that in no branch of medical science, even at the present day, is empiricism so closely followed, and rational medicine so entirely ignored, as in the one before us.

The present work, we are told in the preface by the translator, represents Vol. II. of Professor Ewald's work upon the diseases of the digestion. The first volume has already been published in English, the translator being Dr. Saundby. Another English version of the volume, now under review, has been published by the New Sydenham Society of London, and that part of the original work which treats of the physiology of digestion has been published in connection with the London translation.

The book is copiously illustrated, printed on good paper and in clear type, and heavily leaded, thereby rendering it easy to read. It contains chapters, in the form of lectures, upon the methods of determining the acids in the gastric contents, upon stricture and stenosis of the cardiac orifice and of the pylorus, including contraction and dilatation of the stomach. There are also lectures upon gastric ulcer, inflammation of the stomach, chronic catarrh of the stomach, and neuroses of the stomach. The last lecture in the volume is divided into "the correlation of the diseases of the stomach to those of other organs" and "the practical value of the modern chemical agents."

The value of the work is increased by copious notes, giving references to authors quoted, and minutely describing facts which are mentioned in the text. To the practical physician, whether he has or has not the time or inclination to study the chemical changes in the gastric contents, much of interest may be found in the work. A number of prescriptions are given to illustrate the combination of remedies in the relief of the various affections of the stomach. When we remember that researches concerning the functions of the stomach in disease and in health may be considered the life-work of Professor Ewald, the work is singularly free from the excessive statements and theoretical atmosphere which generally are attached to works written by those who devote themselves to any particular line of thought.

If the book is not largely used by the American profession, it will be because the average practising physician will not appreciate its advantages, and if he does not appreciate them it will be because he is too careless to examine it and too lazy to study the new ideas which advanced medical study has proved to be correct.

There is now no excuse for treating any of the diseases of the stomach purely by guesswork, and although it is impossible in the milder gastric disorders to persuade most patients in this country to permit of the lavage which is necessary for the careful study of the stomach contents, we have certainly had completed for us a method of diagnosis which should always be resorted to in serious cases. It is hardly necessary to add that as this edition has been revised not only by the translator but by the author himself, it contains the very latest information in regard to the subject. This is emphasized by the fact that the author has added to the American edition notes which do not occur in the original.

BOOK ON THE PHYSICIAN HIMSELF, AND THINGS THAT CONCERN HIS REPUTATION AND SUCCESS. By D. W. Cathell, M.D. New Tenth Edition. Thoroughly revised, enlarged, and rewritten.
Philadelphia: F. A. Davis & Co., 1892.

That a tenth edition of a book, which is not devoted to medical science itself, should have been called for by the medical profession within a few years after the publication of the first edition, shows that there must be something in it which is of value to the practising physician in his daily life. The secret of its success is manifest to any one who opens the book and peruses a few pages. He will find that unconsciously he goes from paragraph to paragraph, constantly meeting with advice concerning experiences he has already passed through and may pass through again, or with others which he realizes may come to him at any moment. There is scarcely a member of the profession who will not find in many of the chapters suggestions which will show him the faults in his professional conduct, either in matters of right and wrong, or in those of policy. In many places the author is delightfully refreshing in the concise and lucid way in which he tells us how to avoid semi-ludicrous experiences.

The book is at once funny and to the point, and is only marred by the use of unnecessarily plain Anglo-Saxon in a number of places. The following sentence is a fair example of the sound advice given in one of the more indelicate but, after all, correct portions of the book:

"Observe reticence at your visits, and do not allude to the private affairs of anybody from house to house. Let your lips be hermetically sealed to the fact that So-and-so has, or ever had, venereal disease, hemorrhoids, fistula, ruptures, leucorrhœa, or constipation; or that abortions, private operations, etc., have taken place; or that any person has recourse to anodynes or stimulants; or that Mrs. Ohmy had a baby too soon after her marriage, or that Miss Awfulone or Miss Angelicus had one without being married at all; or that Mr. Badegg is addicted to secret immoralities; or that Moonlight or Sunrise has or has had a venereal disease; or that Allgood is not good at all, but has this or the other bad habit. No matter how remote the time, if patients wish their secrets told, let them be their own talebearer. You have no right to disclose the affairs of patients to any one without their consent."

To the younger members of the profession we heartily recommend the work as one which will prove a useful guide to them in their conduct from day to day. As the author well says in his preface, he wishes the advice given in his book to harmonize with that given by the Bishop of Lonsdale to those who came to him inquiring the way to heaven. His answer was, "Turn to the right; then go straight forward."

THE SCIENCE AND ART OF MIDWIFERY. By William Thompson Lusk. Illustrated. Fourth Edition. New York: D. Appleton & Co., 1892.

Among all the books published, concerning any branch of medicine, which have been a credit to the profession of the United States, Dr. Lusk's book is certainly one. Recognized as being a valuable work of reference and a useful text-book for the student as soon as it appeared in the medical book-market, it has passed through successive editions, until it stands to-day one of the most, if not the most, popular text-book in the medical colleges of this country. This fourth edition not only contains ordinary cuts which are *extra*ordinary, in that they clearly illustrate the meaning that the author intends to convey, but in addition others, by better processes than are generally employed in book-printing, which in several instances require an entire page for their printing. The illustrations of the development of the ovum are superb, and the colored plates, occurring between pages 666 and 667, are models of their kind and a credit to the house which published the work. An unusually clear and well-executed plate follows page 8, and shows a section through the pelvic organs of a multipara.

We are sorry that Dr. Lusk persists in reiterating the statements made by Dr. Fordyce Barker in regard to the value of chlorate of potassium, given in doses of 20 grains, three times a day, for weeks at a time, in cases in which there is placental disease, with decrease in the respiratory functions of the organ. It has already been proved again and again that chlorate of potassium is absolutely valueless under such circumstances, and not only has clinical experience proved this to be true, but it is a physical impossibility for the chlorate of potassium to part with its oxygen in any quantity at the temperature of the body. If it exerts any effect whatever, it decreases the oxidizing power of the blood through action upon the hæmoglobin, and there is great danger in such doses of irritating kidneys which already may be pushed to the last extremity of work. It is true that Dr. Lusk states that it has not always proved to him to be of service, and it would seem that this is but another illustration of the fact that even the best physicians may at times confuse coincidences and the real effects of drugs. The advice which Dr. Lusk gives in regard to the use of ergot in parturition is sound, and he reiterates the too often ignored maxim that under no circumstances should ergot be given unless there is absolutely no obstruction to the easy birth of the child.

Dr. Lusk's book will undoubtedly continue to be as popular as it has been in the past, for it is one deserving of the highest praise and worthy of the confidence of the practising obstetrician.

OINTMENT FOR ECZEMA.

℞ Oxide of zinc, gr. xv;
Powdered talc,
Vegetable tar,
Vaseline, of each, ʒv. M.

Sig.—Make into an ointment, and apply to the part morning and night.

—*L'Union Médicale*, May 10, 1892.